

COAL AGE

Vol. 2

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No. 26

NOT one man in ten will commence the next year without making new resolutions. They may not be penned on paper, or shaped as a promise to another, but just the same, we will unconsciously pledge ourselves by writing a proposed course of action indelibly on our minds.

And these new-year resolves are both serious and ludicrous. Serious, because not all the promises are broken, and January 1 means a real change in the lives of many. Ludicrous, because a mistaken course of conduct on the first of November or December should be rectified then without waiting for New Year's Day to come round before we correct our errors and clean the slate.

However, there could be no race if there were no starting point, and the sun, the moon and the forces of nature have all connived to make us run in 12-month laps. For weeks ahead we oil and repair the machinery of life for the "grand getaway," and we each of us hope on this new lap to overtake those competitors or friends who distanced us so far in the running last year.

The ill side of the practice of making new-year resolutions is in the weakening of will power, which results from promises broken. There is an old saying—"He who resolves suddenly repents at leisure"—and too often we are thoughtless in making promises even to ourselves. The will is the central force of character, and whatever impairs it diminishes success. It must be trained to habits of decision—otherwise it will neither be able to resist evil, nor to follow good. What we want most is not talent, but purpose; not the power to achieve, but the will to labor. Conscience sets a man on his feet, but it is the will which holds him upright.

And today we are going to suggest to all our readers one new-year resolve—let each of us promise to be more charitable. There is none of us, from manager to miner, but can find room for improvement in this direction. Charity is only a matter of fairness and honesty, and on the last count is the best kind of business policy. We do not refer to alms-giving, which only serves to make the dependent classes more dependent, but advocate such action as helps others to help themselves. Nature teaches us a lesson by giving rain and sunshine freely to the evil and un-

thankful; therefore, we should learn to measure our charity, not by men's deserts, but by their needs.

It has been aptly said that "Charity gives itself rich, while covetousness hoards itself poor." What we give out at the door is doubly put in at the window. This truth has been exemplified many times in the history of mining. Coal operators have frequently endeavored to take advantage of their employees by holding down wages, by providing unsatisfactory and unsanitary living conditions, and by charging excessive prices at company stores. The result is inevitable. Strikes occur, blood is shed and property is destroyed. Employers once successful and blinded with power, refuse to listen or to see, until at last the knell sounds and they open their eyes to look on their own financial ruin.

The trouble in southern West Virginia at present is a fair example of corporation selfishness. We hold no brief for lawlessness on the part of miners, but in many such cases there is as much righteousness on the side of the men as on the part of the coal companies. The principle that "might makes right" has prevailed too long in some coal fields. The industry as a whole will suffer from this policy, even though it is adopted by only a few. The chief trouble is that so many of those who dictate the line of campaign for the companies do their thinking and planning in offices located 500 or 1000 miles from the seat of trouble. It's the old story of getting that last penny which no one has ever yet been able to corral.

Beneficence and good-will on the part of individuals or corporations will lack in material essentials, until we all come to believe that the world must be ruled by kind and earnest guardianship, in which the irregularities of fortune are in part made up by the spontaneous charity of those who were better born. On this coming New Year's Day let us discard the principle that "life is only a survival of the fittest," and in making our fresh resolutions be guided by the sentiment one writer expressed in the following words:

Don't look for the flaws as you go through life,
And even when you find them
It's wise and kind to be somewhat blind,
And look for the virtue behind them.

Our Future in the Export Trade

Accurate information and deductions from practical experience being of value to the American coal exporter, by showing the conditions he may expect to meet with, the following general comparisons and data may bring out more facts worth consideration and be of assistance to those who are endeavoring to pull the British Lion's tail.

We will not discuss to any extent the question of ocean freights, although they are really the key to the whole export situation; they are now 33 per cent. higher, on the average, than for the past twelve years. It will be sufficient to say that American coal exporters are almost entirely dependent on British ship-owners in their efforts to decrease British trade and influence.

RETURN CARGOES

This is the stumbling block which American exporters are finding themselves falling over. The world's trade chan-

By F. R. Wadleigh *

The first of a series of articles, that when completed, will comprise the most exhaustive and detailed investigation of our present and future position in the world's coal markets, that has ever been published. The present installment deals with the transportation problem, our position as viewed in foreign countries and gives a summary of the world's export business.

*160 Botetourt St., Norfolk, Va.

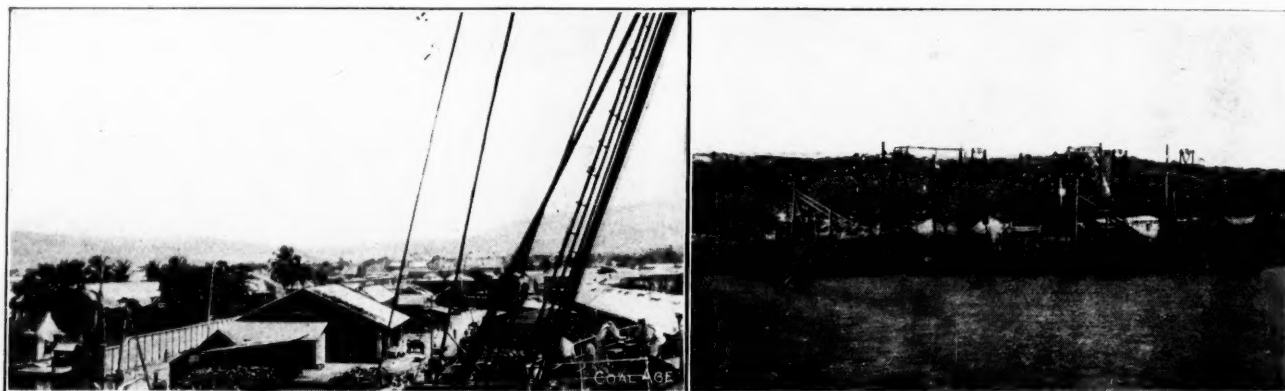
power and water ballast to re-cross the Atlantic under water ballast and bunker coal after discharging her cargo at, say, Genoa, could, with proper dispatch, I think, carry coals from Norfolk, Va., to Genoa, at from \$1.92 to \$2.04 per ton

built, owing to the demand for tankers and passenger ships, while the bumper crops, the higher cost of wages and new liability laws, all have their effect on the freighting rates. Sir Arthur Wilson's figures given above would hardly hold good now, although their ratio to current rates, then (1904) and now, may still be correct.

ATTITUDE OF BRITISH OWNERS AND SHIPPERS

In the Hearings Report of the 1904-05 British Commission on Coal Supplies, several leading English shippers and mine owners spoke of the American competition with their coals, as follows:

"The competition of American coals has only as yet affected our distant markets, but fears have been expressed by some of the witnesses that the American production will outstrip local demands and that it will become necessary for them to establish a large export



WELSH ADMIRALTY COAL AT THE KINGSTON, JAMAICA, DOCKS AND THE BERWINDS UNLOADING PLANT AT HAVANA

nels are not to be altered and changed in a day and we shall never take our destined place in the world's coal markets until we have our own self-trimming colliers, built for the trade, with 10,000- to 12,000-ton capacity, capable of making 10 or 11 knots on a coal consumption of 25 to 30 tons per day; or for the nearer ports, steel sea-going lighters or barges to be towed, as we do now in the New England trade and as Germany is doing in the North Sea.

In this connection, we give the following statement by Sir Arthur Wilson, the head of one of the largest coal-exporting firms in the world:

"The advent of large-bulk, dead-weight carriers of self-trimming type, and the improved methods of applying water ballast to enable steamers to safely navigate the Western ocean, must be reckoned with. One of these large modern steamers of, say, 10,000 tons dead-weight capacity, with sufficient engine

and leave a fair sum for depreciation.

"My inquiries from America show that good coal can be loaded f.o.b. Baltimore at \$2.45 per ton; add to this the sum of \$2.08 ocean freight and it would appear that American coal can be delivered at Genoa at a total cost of \$4.53 per ton."

With the present high level of cargo rates and their further upward tendency, we are almost at a standstill on foreign shipments of coal, excepting a few unusual cases, where shipping contracts were made last year or where the buyers have their own ships. The reason for the unprecedented rise in rates is due to the fact that the world's commerce has so increased that the building of ships has not kept up with it. It is often not a question of rates with the coal shipper but the difficulty of getting ships at any rate, and every indication points to further advances for some time at least. Fewer "tramps" are being

trade in order to dispose of their surplus.

"Sweden: The State Railways, during the last two years had tried American coal and pronounced it satisfactory. * * * *

"Where the price at Newport News against Cardiff was less, as it would be for Pocahontas, New River coal, Mr. Mungall was afraid Cardiff would have to look out, as although the American product was more friable even than the Welsh coal, it gave almost as good results. * * * *

"Our experience is that steamship owners or railway companies will readily take New River coal at the reduction of 48c. per ton, on the price of the very best Welsh. * * * *

"Some few years ago, in consequence of the very high prices which were paid for Welsh descriptions, an experiment was made with coals from the United States which was most satisfactory in

every respect; the shipments were made mostly to Marseilles. * * *

"He said that at Baltimore (although that was not the best place to ship from) coal could now be bought at \$2.40 per ton f.o.b., and steamers of 10,000 tons could be constructed to take these coals at \$1.92 from there to the Mediterranean ports. He thought that they could be delivered at Genoa, from America, at the present time at \$4.32 per ton, if one constructed steamers on purpose for it. This Pocahontas coal in America was said to be quite equal to the best Welsh coal. He knew for a fact, that his steamer, which went to America and used a certain quantity of that coal, burnt less when returning than they did of the very best Yorkshire, and speed was not reduced, although the reduction in consumption amounted to 10 per cent."

"The reason we were able to preserve our competition successfully against American coal in the Mediterranean was really the freight question."

In reading these remarks, however, we must remember that at the hearings,

steamers to carry 200,000 tons of American coal to Havre over the succeeding six months. These were received with a good deal of doubt but as it was common knowledge that, for several years past, large quantities of American coal had been shipped to the Compagnie Generale Transatlantique and the Chargeurs Raunis, nobody would venture to assert that there was nothing in the rumor, especially as it was known that the Americans had been endeavoring for some time to establish a line of steamers with Spain in order to obtain iron ore for some of their great iron and steel works. As was pointed out, however, by more than one expert, even if American coal could be bought, as alleged, at \$2.40 f.o.b., and the freight rate averaged about \$2.28, the cost delivered at Havre—\$4.68 per ton—would still be in excess of the price of Durham and Northumberland coals, which moreover, could be delivered at the port of destination in much better condition than American coal. * * *

"Under these circumstances, the fear

diversion of the business caused no anxiety to Welsh coal owners, neither did later reports that several of the transatlantic steamship companies had arranged to bunker their vessels at New York instead of loading at the Welsh ports."

From *The Colliery Guardian*, June 21, 1912:

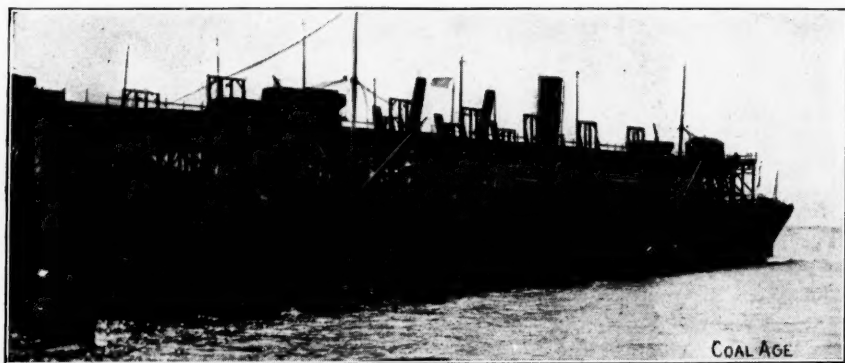
"A good deal has been heard lately of the competition of American coals in the Mediterranean, and it will be interesting to readers to learn that within the last two months a large cargo of American coal was sent on speculation to Italy, but that after lying in one of the ports for no less than three weeks, during which every attempt was made to dispose of it, the steamer had to leave with its cargo still on board, bound, it is believed, to some South American destination. This is very significant as to the opinion held by Italian buyers regarding American coal. As is well known to all experts, this coal is not only friable, but of so combustible a nature that it is customary for merchants who have bought it to insure it against spontaneous combustion, and needless to say the premiums charged in such cases are higher."

By the Genoa, Italy, Correspondent of the *Journal of Commerce*, Liverpool, July 26, 1912:

"The cargo of New River Stella is unloading regularly; the lumping has not been found the same as Ferndale or Nixon (British Admiralty coals) but nearer to Pocahontas. The cargo has been sold here on satisfactory conditions for sellers, who are dealing for a second shipment; the quality was according to analysis and if our consumers will accustom themselves to the work it requires from their firemen they will have reason to prefer it to the English and especially the Westphalian coal."

From the *Journal of Commerce* (Liverpool), Sept. 6, 1912:

"During the period under review (year ending June 30, 1912) America secured good contracts in Egypt and Italy owing to fears that labor disputes in Great Britain would prevent regular deliveries of Welsh coal. The competition of American coal in Mediterranean markets as a direct consequence of labor disputes in Great Britain, resulted in the loss to us of a little more than a quarter of a million tons. Having regard to the national coal stoppage, and the general upheaval of trade in the period under review, the total loss cannot be said to have been great. It is gratifying to observe that, with the return to normal conditions, America's competition has fallen extremely flat and the shipments



LOADING COAL FOR THE ITALIAN GOVERNMENT AT THE C. & O. PIER NO. 12

strong efforts were made by the British coal people to show their Government the necessity of repealing the tonnage export tax on coal, and for this reason American competition was made more of than its importance really warranted at that time.

Now, and especially since the British strike has been settled, this attitude has changed and American competition is, apparently, belittled and minimized. The following quotations from three of the leading English trade papers; *The Colliery Guardian*, *The Iron & Coal Trades Review* and *The Journal of Commerce*, will illustrate the present outward state of feeling towards American competition in the foreign coal trade:

COMMENTS OF FOREIGN JOURNALS

From *The Colliery Guardian*, Jan. 12, 1912:

"Attempts were made to 'bear' the market by the dissemination of reports that inquiries were being made for

of a strike seemed for a time to be predominant, and the administrators of the Egyptian State Ry., instead of arranging with Welsh collieries for the whole of their requirements, as in past years, resolved to purchase a quantity of American coal also. They placed orders for about 250,000 tons of Monmouthshire coal for delivery during the first half of 1912 at about \$3.36 to \$3.45 per metrical ton (net), and then, for the first time, they placed an order for 35,000 tons of American coal with the Consolidated Coal Co., to be delivered at the rate of one cargo per month.

"The price of this coal was reported to be \$2.40, plus a freight rate of \$3, from Baltimore to Alexandria. The freight from Cardiff to Alexandria was \$1.80 (Egyptian terms), and taking the price of Monmouthshire coal at \$3.78, which was about the figure last paid by the Egyptian authorities, it left an advantage in favor of Welsh product of fully 30 cents per ton. Of course, the

made in the zone of Great Britain's sphere, have of late been absolutely negligible."

From the *Journal of Commerce*, July 19, 1912:

"Is America likely, in normal times, to prove a competitor with British coals in the Mediterranean and South American markets in the near future? This is a question which demands the earnest attention of all coal exporters in this country, particularly those of South Wales. American coal competition in the past has been due to opportunism. In periods of extreme activity and prosperity in the British coal trade prices for Welsh and English fuels are advanced to such comparatively high levels that the competition of American coals in foreign markets is rendered possible.

"Several determined attacks have been made by the Americans on European markets, and although a break in British prices has been followed by the falling off of exports from America, the hold obtained upon the markets has been strengthened, as is witnessed by the larger orders taken by America after each succeeding attack. Britain's misfortune with regard to the national coal strike proved America's opportunity, and, as has previously been chronicled in these columns, large quantities of Virginia coals have been thrust last year and this year in markets which are looked upon as the prime sphere of British coals abroad."

COMPETITION AFFECTS SOUTH WALES

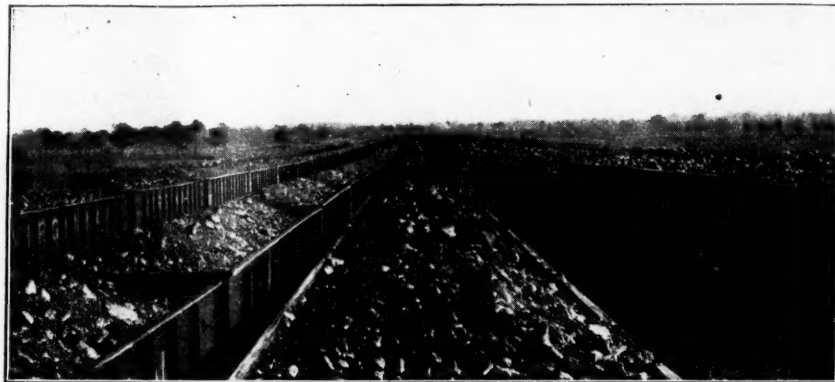
"This district is affected more than any other of the United Kingdom, and although the Welsh coal is the best steam-raising fuel the world can produce, the question of price to large consumers is naturally an important factor."

"The national coal strike proved a splendid opportunity for America, but there is sufficient evidence for the belief that American coal exporters are contemplating securing Mediterranean and South American business in normal times. The high freight rates from the Atlantic seaboard of the United States compared with the cheap rates ruling from South Wales will prove the most powerful factor that American exporters will have to combat in normal times."

"Against this they have the undoubted advantage of cheaply worked coal, raised from comparatively shallow depths, with cheap transportation and handling facilities at the port of loading. Moreover, it is possible when large contracts are obtained to secure freight rates on more advantageous terms, especially if homeward freights can be assured. The tremendous coal resources of the States render it possible for production to be greatly increased, and this factor must

not be lost sight of in endeavoring to gage the possibility of America proving a serious competitor with British coals in the near future."

"Despite the fact that American coal possesses a far larger proportion of small sizes than does Welsh, and that the calorific power is much lower, they have succeeded in retaining orders from France, Italy, and Austria, although no organized attempt on a large scale has yet been made. That it will be made on the South American and Mediterranean markets is shown by the space devoted to the matter in American Consular reports which are published for the special benefit of Americans only, and not like our own Consular reports, which are issued to any foreigner that chooses to pay for them. Further evidence of an attempt to widen their sphere of opera-



VIRGINIAN RY. YARDS AT SEWALL'S POINT, SHOWING 1500 CARS OF NEW RIVER COAL

tions is shown by the establishment of American coal exporters' offices and agencies on the Continent and in South America."

NECESSITY OF STUDYING THE FOREIGN MARKETS

As to our own attitude on the subject, it is obvious that the coal exporters of the United States are inclined to be too optimistic; no permanent and satisfactory results will be obtained unless we know exactly where we stand in the foreign markets, what we have to offer as against our competitors, what our coals will actually do in comparative trials and what difficulties in the way of prejudice, graft, freight rates, different selling methods and different combustion conditions we are likely to encounter.

Most of our attempts to enter this trade so far, have been made without giving a thorough consideration to these difficulties and without sufficient knowledge of the foreign export coals, their structure, analyses, preparation and burning qualities, as well as of the conditions under which fuels are used in foreign countries, and the prejudices of

the inhabitants. We try to force our coals down their throats, so to speak, without any special effort to make them palatable and suitable.

We have worked on the supposition that our coals were quite the equal in every way of the best grades of Welsh coal—a pure assumption made often without ever having seen the latter. While they are as good in theoretical heating value, they are not by any means always their equal in preparation and suitability to the needs of foreign users. Moreover, in the Latin American countries especially, friendship and use are strong competitors and must be recognized and overcome, apart from any superior analytical qualities in our coal. We must also recognize the fact that to compete, on anything like equal terms with the Welsh coals for the world's steam business, we

must send out the very best coal we have, clean, well prepared and with the greatest possible amount of lumps.

There is no sense in our belittling the foreign coals, as has been done in recent articles on the subject. Some of these coals are quite equal to any that we have in every way and we have got to show either lower prices or superior sales methods in order to displace them.

Our methods of handling coal at tide-water, as compared with foreign methods, is a good example of how we misuse it. Anyone who has seen cargoes of New River-Pocahontas coals unloaded at foreign ports, after having seen the same loaded at the mines, will bear out this statement, especially when comparison is made with the loading of ships at Cardiff. Here we sacrifice everything to speed in dumping; there they give close attention to cheapness of handling and the prevention of breakage.

Let us now see what foreign markets are open under ordinary condition, to American coals. This is shown by the following statement, the consumption given being approximate of course and taken from the latest available statistics:

EXPORT TRADE OF THE WORLD

Country	Competing Coals	Imports, Tons
Austria	British, German, Belgian, Native	960,000
Italy	British, German, Austrian	9,595,000
Spain (Including Canary Islands)	British, German, French, Native	3,044,000
France	British, German, Belgian, Native	16,230,000
Portugal (Azores and Madeira)	British, German	1,101,000
Egypt	British	3,104,000
Africa, North Coast	British, German, French	2,000,000
Africa, West Coast	British, French, Native, German	1,797,000
Mexico	Oil, British, Australian	1,800,000
West Indies	British	1,684,000
Brazil	British	3,717,000
Argentina	British	1,294,000
Chile	British, Australian, Japanese, Native, Oil	925,000
Uruguay	British	80,000
Peru	British, Australian, Native, Oil	60,000
Ecuador	British, Australian, Oil	60,000
Colombia	British, Native, Oil	60,000
Venezuela	British, Native	60,000
Bolivia	British, Australian, Native, Oil	60,000
Central America	British, Australian	60,000
Canada	Native	8,905,000
Panama	Possible native coals	488,000

foreign countries. Of this amount 2,598,366 tons went to Panama, Mexico, Cuba and West Indies, leaving only 670,801 tons to South America, Europe, and other countries.

Taking the fiscal year ending June 30, 1912, a period covering the English coal strike, the United States exports of bituminous coal alone were as follows:

Canada	10,671,982
Panama	488,152
Mexico	344,112
Cuba	1,121,560
West Indies	691,883
Other Countries	1,391,538
Total	14,709,847

Leaving out the exports to Panama, Mexico, Cuba and West Indies, where the United States has little competition now, those to other foreign countries show an increase of 258,611 tons as compared with the year ending June 30, 1911.

This figure, therefore, may be taken as representing the business taken from for-

1. Calorific Value
2. Smokelessness
3. Cleanliness
4. Hardness
5. Freedom in Burning
6. Minimum Ash and Clinker
7. Coal must not give trouble in stoking

Any coal to be placed on the list must go through two steam tests, one a preliminary and the other an extended trial at sea.

Briquettes, made from dock screenings of Welsh steam, with a small admixture of anthracite, are also used by the British Navy. These briquettes are made at a commercial plant, under the supervision of a naval officer, and are held mainly as a reserve stock on account of their storage qualities; they are considered to have an equal value as fuel with the best Welsh coal.

Vast Coal Reserve

The known coal fields of the United States embrace a total area, according to the United States Geological Survey, of 310,296 square miles, to which may be added something over 160,000 square miles of which little is known, but which may contain workable coals, and about 32,000 square miles where the coal lies under heavy cover and is not considered available under present conditions. The supply of coal before mining began is estimated to have been 3,076,204,000,000 short tons, of which 1,922,979,000,000 tons were considered to be easily accessible and 1,153,225,000,000 short tons to be either so deep or the beds so thin that they are accessible only with difficulty. Classified according to the character of the coal, the original supply consisted of 21,000,000,000 short tons of anthracite, 1,661,457,000,000 tons of bituminous coal, 650,157,000,000 tons of sub-bituminous coal, and 743,590,000,000 tons of lignite, the supply of bituminous coal being something more than that of all other grades combined.

The total production of coal to the close of 1911 has amounted to 2,270,798,737 short tons of anthracite and 6,468,773,690 tons of bituminous coal, or an aggregate of 8,739,572,427 tons. This total production to the close of 1911 represents, including the waste of coal in mining, an exhaustion of the beds equal to 14,181,990,000 short tons, or somewhat less than 0.5 per cent. of the original supply. In other words, the quantity of coal still remaining to be mined amounts to 3,062,022,020,000 short tons, or a little more than 99.5 per cent. of the original supply. The annual rate of exhaustion at the present time, as represented by the production in 1910 and 1911, is 0.025 per cent. of the supply. The quantity of coal still in the ground at the close of 1910 was 6000 times the production of that year, or, estimating a half ton of coal lost for every ton recovered, the supply is equivalent to 4000 times the present annual rate of exhaustion.



TWO VIEWS OF THE LAMBERTS POINT NO. 3 PIER

BRITISH EXPORTS FOR 1911

Exported to	Long tons
Russia	3,439,256
Sweden	3,832,914
Norway	1,968,628
Denmark	2,846,011
Germany	2,846,011
Germany	8,968,838
Netherlands	2,132,418
Belgium	1,559,309
France	10,272,959
Portugal, Azores and Madeira	1,071,317
Spain and Canaries	3,024,720
Italy	9,223,081
Austria-Hungary	960,458
Greece	683,021
Turkey	501,039
Egypt	3,104,268
Algeria	1,095,319
United States	6,946
Chile	643,757
Brazil	1,684,739
Uruguay	926,618
Argentine Republic	3,264,965
Gibraltar	331,602
Malta	436,928
British South Africa	72,072
British India	220,445
Straits Settlements	33,155
Ceylon	279,941
Other Countries	1,822,685
Total	64,599,266
Anthracite	2,454,523
Steam	47,119,017
Gas	10,504,172
Household	1,540,710
Other Sorts	2,980,844
Total	64,599,266

The total exports of the United States for 1911 were in long tons, 17,432,000, of which 3,553,999 tons were anthracite and 13,878,754 bituminous.

All of the anthracite but 55,000 tons went to Canada, as well as 10,609,000 bituminous, leaving 3,269,754 to other

eign coals, during the period in question, in markets where we are in direct competition with them. This is not a very encouraging showing in view of the efforts made and the money spent by the coal selling agencies, especially when we take into consideration the fact that the period under review covered the time of the British strike.

The following Welsh coals are on the British Admiralty list:

WELSH COALS USED BY BRITISH ADMIRALTY

Albion Merthyr
Cambrian Navigation
Cory's Merthyr
Cyfartha
Dowlais Cardiff
Dowlais Merthyr
Ferndale
Great Western Navigation
Harris' Deep Navigation
Hills Plymouth Navigation
Hoods Merthyr
Imperial Navigation
Insole's Cymmer
Insole's Merthyr
Lewis' Merthyr
Locket's Merthyr
National Merthyr
Naval Merthyr
Nixons Navigation
Ocean Merthyr
Oriental Merthyr
Penrhyber
Powell Duffryn
Rhymney Merthyr
Standard Merthyr
Tynysbedw
Ynysfaio Merthyr

The placing of coals on the Admiralty list is based on the following requirements:

Stone Dust as a Safety Provision

Special Correspondence

While many of the mining engineers of the world have for a number of years recognized the danger of coal dust in mines, the increasing number of fatalities from this cause impelled the British Government in 1906 to plan a series of large-scale experiments, "if only for the purpose of concentrating the attention of the mining world upon the danger that coal dust constitutes."

The British Explosions-in-Mines committee, which has charge of these experiments, has just issued its first report to the Secretary of State for the Home Department.

CONCLUSION OF COMMITTEE

The committee in its report, which we have abstracted, states, "The effect of these experiments was, in the first place, to demonstrate conclusively the fact that coal dust, in the complete absence of firedamp or other inflammable gas, is explosive when raised as a cloud in air and ignited under conditions which may exist in a coal mine, and moreover is capable of producing such destruction as is observed after a colliery disaster.

"In the second place, the experiments indicated that the admixture of increasing proportions of an incombustible dust with the coal dust rendered the initiation of an explosion increasingly difficult to accomplish; and that, therefore, a means of preventing coal-dust explosions in mines might possibly exist in the treatment of the roads with incombustible dust, such as stone dust.

"In the third place, the experiments on the mode of propagation of coal-dust explosions gave an indication of the manner of their development during the initial stages, and suggested a way for a more complete study of the problem.

HISTORY OF STONE DUST PREVENTION

"It is difficult to state the exact date of the idea of using stone dust as a protection against coal-dust explosions, and we do not pretend to give a complete history of the progress of thought upon the question. We may, however, mention a few instances in which it was brought prominently into notice.

"That an inert dust might prevent the ignition of coal dust seems to have been suggested by the facts observed in several mine explosions, such as that of Seaham in 1880. The possibility that fine sand strewn over coal dust might prevent the latter being raised in an inflammable cloud is referred to in the report of the Prussian Commission, 1884. It is also alluded to in the report of the Royal Coal Mines Commission in 1886.

"On July 18, 1908, as soon as the Altofts gallery had been constructed, experiments on a large scale with stone

The British committee to investigate explosions in mines recommends the use of stone dust to protect coal workings against explosions but defers statements as to best manner for distributing it. The committee states that stone dust is apparently not harmful if composed of shale.

dust were commenced, under the supervision of W. E. Garforth, and continued in 1909 and in subsequent years.

COMMITTEE RECOMMENDS FURTHER INQUIRIES INTO STONE DUST

"In our opinion further experiments upon the action of stone dust are essential before any final recommendation can be made. For instance, it has not yet been proved that a flaming coal dust which has attained full explosive violence in a mine will be extinguished on reaching a region where stone dust has been strewn over the coal dust, nor that an explosion of firedamp would not be 'extended' by a thin layer of coal dust deposited on powdered stone.

"Further experiments also are needed to test the correctness of Sir F. Abel's conclusion that the presence of an incombustible dust may increase the danger of a gas explosion. The latter experiments we have already started.

"We think, however, that we ought to call attention to the steps which have been taken to put this theory into actual practice not only at Altofts in Yorkshire, but also at the Charlaw, Sacriston and Kimblesworth collieries in Durham, at the New Moss colliery near Manchester and elsewhere. At the present time, inert dust is not spread in zones, but is scattered by hand over the whole surface of such haulage roads as require it.

IMMEDIATE STONE DUSTING RECOMMENDED

"This application of inert dust needs no considerable expenditure of capital, nor installation of plant, and is not a costly operation, and we are of opinion that even in the present incomplete state of our knowledge as to the exact action of inert dust, those who are working and carrying coal along dry and dusty roads would do well to take into consideration this means of obviating danger.

"We do not, of course, question the utility of watering and of keeping the mine clear of dust, or of safety cart-ridges, tamping, and the various other remedies, which it will be our duty to examine.

"Moreover, the proposal to prevent the ignition of coal dust by admixture with an inert dust may not be applicable in all mines, but we consider that the results of the experiments as far as they have gone are sufficiently striking to merit serious attention.

THE TYPE OF STONE DUST TO BE USED

"Inasmuch as the introduction of dust into mines might, unless carefully regulated, produce evils worse than those which it aimed to cure, we deemed it our duty at the outset to take every possible step to see whether it was possible to devise some test to which dust about to be introduced into mines should be submitted.

"With this end in view we requested Dr. Beattie, professor of pathology at the University of Sheffield, to conduct some special experiments.

"The results of his investigations have been in a very marked way to confirm the opinion of Dr. Haldane. They seem to show that dust, if of slate or shale or other argillaceous substances, is not dangerous. On the other hand, all kinds of dust containing finely powdered silica in its crystalline condition, such as is found in Sheffield grinders' shops, are apt to produce fibrosis of the lung and thereby to facilitate the production of tuberculosis. It follows, therefore, that such dusts as these are dangerous.

THE LUNGS OF A PONY NOT AFFECTED

"We thought it would also be of interest to ascertain whether the dust either of Altofts shale or of coal, injuriously affects the horses or ponies employed in the mines. We therefore asked Dr. Beattie to make an examination of the lungs of a dead pony which had worked about 14 years underground at Altofts, and for the last year had been subjected to the effect of the shale dust employed there.

"He reported that very little coal dust and no shale dust was found in the lung, which was quite free from fibrosis, and added that this might be explained by the length and diameter of the windpipe, which having a large superficies, absorbed the dust readily so that comparatively little reached the lung.

"It would, therefore, appear that no injury is to be anticipated to animals in the mine by the use of shale dust, such as that used at Altofts.

"According to Dr. Beattie's experiments the shale dust used by him does not seem any more injurious than ordinary fine coal dust; and we have no doubt that other dusts, when submitted to similar tests, will be found equally innocuous. We propose to have such tests made of other materials."

Colliery Practice in Concreting

By Elwyn E. Seelye*
and A. T. Shurick

Concrete should be deposited in the forms with careful tamping and spading along the face of the forms in order to avoid air spaces. A good tool for tamping and spading against the surface of the forms to eliminate voids or honeycombing is formed from a bar with a flat blade, as shown in the accompanying sketch, Fig. 1.

Depositing Concrete Under Water—If deposited under water it is necessary to take great care not to allow the cement to be washed away. This is generally accomplished by depositing it through a chute and allowing the concrete to gradually occupy the desired space. Sometimes it is placed in paper bags, and lowered into position; the paper bags break allowing the separate batches to amalgamate.



FIG. 1. TAMPING TOOL

Concrete may be laid in cold weather if special precautions are taken to prevent freezing. Salt may be added to the water to lower its freezing point. The water and materials forming the aggregate may be heated previous to the mixing. There is a certain amount of heat produced by the chemical action involved in the process of setting.

In general there is little danger of freezing in massive masonry but the greatest care must be exercised in con-

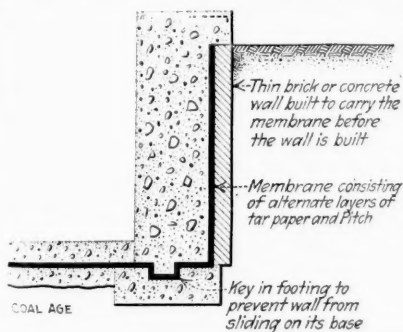


FIG. 2. RETAINING WALL WATERPROOFED BY THE "MEMBRANE METHOD"

creting light reinforced work in cold weather and the same should be carefully inspected after the forms are removed. Any portion showing the effects of the frost should be cut out.

A recent concrete failure was caused by some concrete columns having been frozen so that they appeared to have set after the forms were removed.

WATERPROOFING

There are three general and effective ways of waterproofing concrete; the

The second of a series of articles on concreting. In this installment the theory of design in reinforced concrete is taken up along elementary lines. A number of simple rules and formulas are given especially devised for those not familiar with this class of construction.

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membrane, the integral, and the plaster coat.

Membrane Method—The membrane method consists of the use of lapped tar paper, three ply, four ply, etc., bonded and coated with hot coal tar, or asphalt



FIG. 3. RANSOME TWISTED BAR

pitch. This membrane is generally applied to the outside surface, so that hydraulic pressure will hold it against the wall or slab. The concrete or brick to which it is applied should be dry so that the pitch will adhere well to the masonry, as shown in the accompanying Fig. 2.

Integral Method—The integral method consists in the addition of a compound before mixing, which fills the interstices of the mortar and renders it watertight. There are two classes of these compounds on the market. One is miscible in water and hence is added to the water which is to be used in mixing. The other is nonmiscible and therefore has to be added to the cement while dry, and thoroughly mixed.

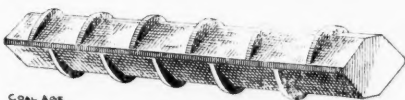


FIG. 4. RIB BAR

I favor the compound which is miscible in water, as difficulty may be experienced in obtaining a homogeneous mixture of the dry compound with dry cement.

Plaster Coat—The plaster coat consists in the addition of waterproof plaster to the roughened surface of the con-

crete. Where this is added to the inside surface hydraulic pressure should be relieved by tapping the soil beneath with small pipes and removing the seepage through pipes by means of a sump and an automatic pump.

The integral method of waterproofing has a disadvantage, as compared with the membrane in that the latter is elastic and a slight crack in the concrete will not injure the membrane. On the other hand a slight crack in concrete, waterproofed by the integral method, will render the waterproofing useless. For this reason the concrete should al-

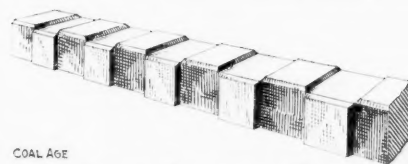


FIG. 5. CORRUGATED BAR

ways be reinforced with steel to provide against shrinkage and temperature cracks when the integral method of waterproofing is used. No difficulty will be experienced in obtaining the materials for membrane waterproofing. The Trussed Concrete Steel Co., of Detroit, Mich., is one of the many firms which manufacture an integral waterproofing compound. The Waterproofing Co., of New York, manufactures a plaster coat which they claim will remain effective against a considerable hydraulic head.

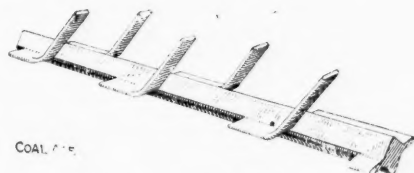


FIG. 6. THE KAHN BAR

A waterproof concrete may be obtained without the addition of a waterproofing compound by the use of a wet rich mixture in which the aggregate is graded from large to small sizes.

Concrete work is generally permanent and indestructible, but when laid against rock containing acid-bearing waters, the action of these may seriously weaken the structure.

STEEL REINFORCEMENT

Purposes of Reinforcement—Steel reinforcement is used in concrete to prevent temperature or shrinkage cracks, and to provide strength to resist shearing, compressive and tensile stresses. Certain forms of metal lath, besides the reinforcing qualities, provide a backing for hydraulic plaster.

In the reinforcement of mass mason-

ry, scraps such as cable or old rail may be used. The commonest forms of reinforcement are the plain bar, the deformed bar, the bar with attached diagonals, wire mesh and stiffened metal lath.

Deformed Bars—There are many forms of patent deformed bars on the market. They are provided with lugs or corrugations on the surface to prevent the bar from slipping through the concrete. In the accompanying illustrations are shown some of the more popular types. See Figs. 3, 4, 5.

Stirrups—In beams and girders it is often necessary to provide for secondary tensile stresses which occur. These are taken care of by the use of stirrups.

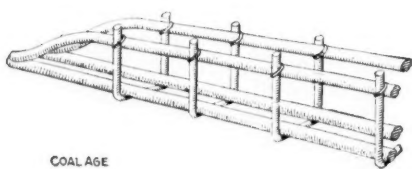


FIG. 7. LOOSE STIRRUPS

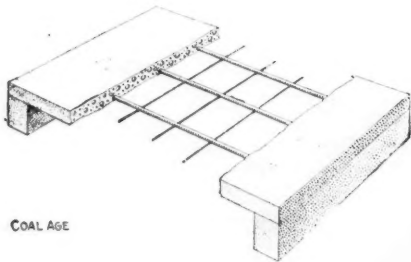


FIG. 8. WOVEN-WIRE FABRIC

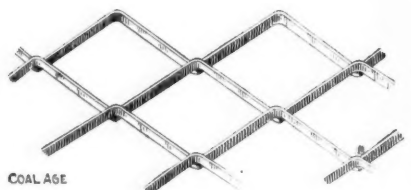


FIG. 9. EXPANDED METAL

These may be merely light rods looped under the bar or rigidly attached to it, as shown in the accompanying drawing, Figs. 6, 7.

Steel Fabrics for Slab Reinforcement—There are also the wire cloths used for reinforcing slabs. They consist of woven fabrics of steel wire with a large section running parallel to the span and a light wire at right angles to it. An illustration of this is shown herewith, Fig. 8.

In the same class are the expanded metal fabrics, which consist of sheets of metal expanded to form a mesh. Chief among these are the expanded metal and rib metal, shown in the accompanying illustrations, Figs. 9, 10.

Steel Fabric to Support Plaster or to Act as Centering—The stiffened metal laths

are made from sheet steel generally from 22 to 28 gage. They are stamped and expanded to provide a plaster clinch and stiffened with V-shaped ribs. They are used to support plaster and thus form partitions. They are also used for slab reinforcement and being close meshed and stiffened with a rib, they eliminate the necessity for a large portion of the centering. A popular type known as Hy-Rib is shown in the accompanying illustration, Fig. 11.

DESIGN

The theory of the design of reinforced concrete beams is quite complicated and it is my intention to describe

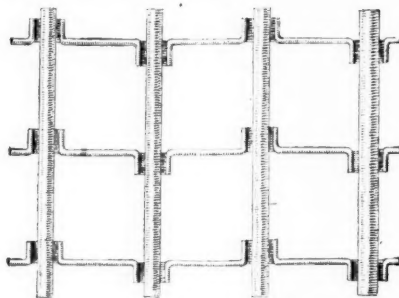


FIG. 10. RIB METAL

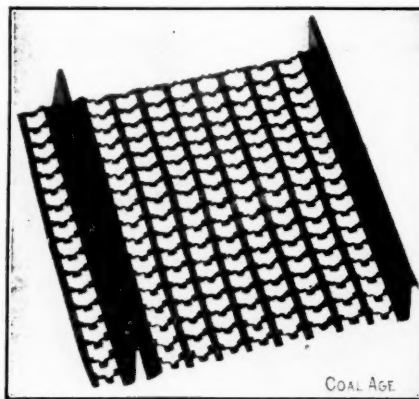


FIG. 11. HY-RIB STEEL FABRIC

it only sufficiently to give the reader a general idea of safe working unit stresses and of the assumptions on which the theory is based.

Working Unit Stresses—Safe compressive stresses on different concretes in pounds per square inch are as follows:

	1:2:4	1:3:6	1:4:8	1:1:3
Broken stone or gravel concrete.....	600	500	400	300
Cinder concrete.....				

Concrete hardens with age and the above values are those which may be assumed at the end of thirty days.

Precautions While Setting—Concrete obtains its strength mainly through the formation of crystals, on the addition of water, and hence should be mixed wet, and protected from too rapid dry-

ing. Great care should be taken not to disturb concrete during the process of setting, as when this occurs it will not set up again. For this reason re-tempering of the concrete should not be permitted.

Comparative Strength—A rough idea of the strength of a reinforced concrete beam may be obtained by assuming that it will carry two-thirds the load of a timber beam whose depth is equal to the depth of the concrete beam from the top to the center of reinforcement. This is assuming that the area of the reinforcement is equal to at least 0.75 per cent. of area of the concrete cross-section above the steel. This is illustrated in the accompanying line cut, Fig. 12, where the concrete beam should be about $\frac{2}{3}$ as strong as the wooden beam. Ap-

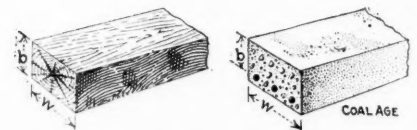


FIG. 12. COMPARISON OF WOOD AND CONCRETE BEAMS

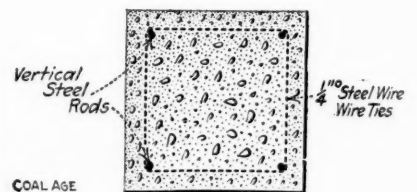


FIG. 13. SECTION OF TYPICAL COLUMN

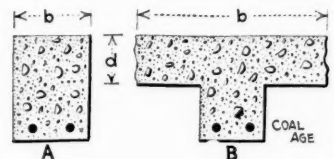


FIG. 14. RECTANGULAR AND "T" BEAMS

proximately the same ratio obtains for the relative strength of timber and concrete in compression.

Knowledge of this should be of great value to a practical man who may wish to use concrete for timbering in place of wood. By experience he will know about what size prop or crossbar to use and can proportion the concrete member accordingly.

A concrete strut, unless of excessive width and depth in proportion to its height should always contain about 1-per cent. vertical steel rods tied together with wire ties, as shown in the illustration herewith, Fig. 13. A wall will in general not need reinforcement unless there is a horizontal force exerted against it.

Bond Essential—In concreting rein-

forced work it should always be remembered that the bond, between the steel and the concrete, is essential to the strength of the work and consequently great care should be exercised in tamping the concrete around the steel.

Working Formula for the Flexure—
A practical working formula will now

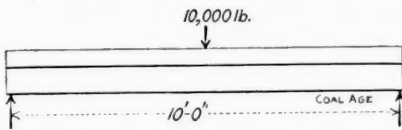


FIG. 15. BEAM LOADING—PROBLEM 1

be given for the design of a concrete beam or slab in flexure. To make this clear the reader is asked to recall the formula for the design of a wooden beam.

In wood we have:

$$M = \frac{1}{8} b (h^2) R$$

M = The bending moment in inch-pounds.

b = Width of the beam in inches.

h = Depth of the beam in inches.

R = Safe stress per square inch in timber.

In concrete we have:

$$(A) \quad M = 108bh^2$$

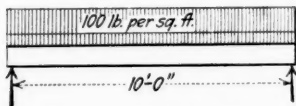


FIG. 16. BEAM LOADING—PROBLEM 2

M = Bending moment in inch-pounds.

b = Width of beam in inches.

h = Effective depth of the beam in inches, i. e., the distance from the top surface to the center of the steel reinforcement, as illustrated by the 8-in. dimension in Fig. 20.

The attention of the reader is called to the fact that if the beam is cast with

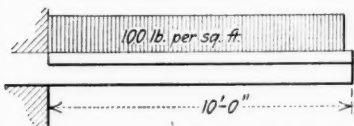


FIG. 18. BEAM LOADING—PROBLEM 6

the slab, the width may be taken as greater than that of the beam proper, as illustrated at B, Fig. 14. In either case the formula for the area of the steel would be:

$$(B) \quad \text{Area of steel} = 0.008 \times b \times h.$$

In the case of a T-beam b should be limited to $\frac{1}{3}$ of the span and should not be more than $8 \times d$.

PROBLEMS

The problem of design of beams and slabs is separated into two distinct operations. First the bending moment must be figured and then the proportions

of the design are computed. The following are the commonest cases of loading which confront the designer.

1. Beam loaded with a single concentrated load (dead load of beam neglected), as illustrated, Fig. 15.

M = The bending moment in inch-pounds.

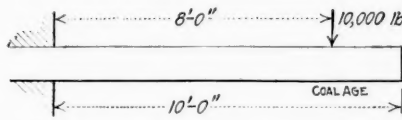


FIG. 17. BEAM LOADING—PROBLEM 4

$$M = \frac{10,000}{2} \times \frac{10}{2} \times 12 = 300,000 \text{ in.-lb.}$$

2. Beam loaded with a uniform load and dead weight of beam included, as illustrated, Fig. 16.

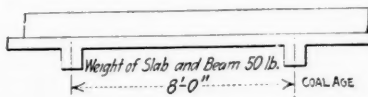
The bending moment in the slab should first be computed.

$$\begin{aligned} \text{Live load per square foot} &= 100 \text{ lb.} \\ \text{Weight of slab per square foot} &= 40 \text{ lb.} \end{aligned}$$

$$\text{Total load per square foot} = 140 \text{ lb.}$$

$$M = \frac{1}{8} \times 140 \times 8 \times 8 \times 12 = 13,440 \text{ in.-lb.}$$

This is for a strip of slab one foot wide.

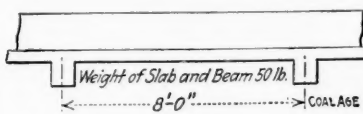


Next the bending moment in the beam must be determined.

$$\begin{aligned} \text{Live load per lineal foot} &= 100 \times 8 = 800 \\ \text{Weight of beam and slab} &= 50 \times 8 = 400 \\ \text{Total load per lineal foot} &= 1200 \end{aligned}$$

$$M = \frac{1200 \times 10 \times 10 \times 12}{8} = 180,000 \text{ in.-lb.}$$

3. The beam loaded with both the concentrated load of problem 1 and the



uniform load of problem 2 would have a bending moment of $180,000 + 300,000 = 480,000$ in.-lb.

The dead load of the beam and slab should always be taken into consideration.

4. Cantilever beam loaded with a single concentrated load (weight of beam omitted) as illustrated, Fig. 17.

$$M = 8 \times 10,000 \times 12 = 960,000 \text{ in. lb.}$$

5. Cantilever loaded with a uniform load. See Fig. 18.

$$\text{Live load per lineal foot} = 100 \times 8 = 800 \text{ lb.}$$

$$\text{Weight of beam and slab per lineal foot} = 50 \times 8 = 400 \text{ lb.}$$

Total load per lineal foot = 1200 lb.

$$M = 1200 \times 10 \times \frac{10}{2} \times 12 = 720,000 \text{ in.-lb.}$$

6. The beam cantilevered, loaded with both the concentrated load and the uniform load will have a bending moment equal to:

$$720,000 + 960,000 = 1,680,000 \text{ in.-lb.}$$

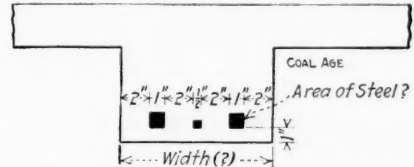


FIG. 19. ILLUSTRATING PROBLEM 1-A

Now let us determine the proper details of reinforced concrete beams and slabs to carry the above loads. This is somewhat of a cut and try process, the depths being generally assumed and the width of beam or T-flange and steel area are computed from formulas A and B respectively.

1A. Beam loaded as in problem 1.

Formula A. $M = 108bh^2$

$$M = 300,000 \text{ in.-lb. (see Problem 1)}$$

$$h = 10.$$

Substituting in formula A:

$$300,000 = 108 \times b \times 10 \times 10$$

$$b = 28 \text{ in.}$$

$$\text{Formula B. Area steel} = 0.008 \times b \times h = 0.008 \times 28 \times 10 = 2.24 \text{ sq.in.}$$

Use two 1-sq.in. bars and one $\frac{1}{2}$ -in.sq. bar.

The width of the beam below the slab

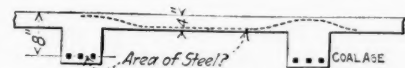


FIG. 20. ILLUSTRATING PROBLEM 2-A

should be as shown in accompanying sketch.

The amount of concrete below the bottom of the steel should be 1 in.

2A. Beam loaded as in problem 2.

Bending moment in the slab = 13,440 in.-lb. (see problem 2), h is assumed at 4 in. (see Fig. 20).

By formula A we have:

$$13,440 = 108 \times b \times 4 \times 4$$

$$b = 8 \text{ in.}$$

Area of steel by formula B

$$0.008 \times 8 \times 4 = 0.268.$$

Hence use two $\frac{3}{8}$ -in. square bars for every strip one foot wide, that is $\frac{3}{8}$ -in. square bars 6 in. center to center.

Bending moment in the beam equals 180,000 inch pounds.

h is assumed at 8 in. (see Fig. 20).

By formula A:

$$180,000 = 108 \times b \times 8 \times 8$$

$$b = 26 \text{ in.}$$

By formula B we have:

$$\text{Area of steel} = 0.008 \times 26 \times 8 = 1.61 \text{ sq.in.}$$

Use three $\frac{3}{4}$ -in. square bars.

The design of problems 3, 4 and 5

is merely a repetition of that given above, and will not be entered into here.

To prevent excessive secondary stresses the following limitation must be observed in designing beams.

Let R = the greatest reaction, i.e. the greatest load on a support, and W = width of beam below the slab. Then R must be less than $40 \times h \times w$. This is important when no stirrups are used.

In the design of a column the following formula is suggested for practical use.

W = Load on column.

A = Area of concrete.

B = Area steel.

$$(C) W = 500 A + 7500b.$$

Problem. The load on a column equals 100,000 lb., what is the size of the column?

Assume area of steel = 4 sq.in. (see Fig. 13). From formula C, $100,000 = 500 A + 7500 \times 4$.

$$A = 140 \text{ sq.in.}$$

Hence use a 12x12-in. column.

A column should never have a width of less than $\frac{1}{15}$ of its unsupported height without making a reduction in the unit stresses.

The question of design is, however, complicated by many assumptions and conditions and in important work should always be in the hands of a competent engineer.

It is also essential to have expert supervision in the field on important construction and carefully watch the progress of the work.

An Installation of Notbohm's Cager

There is in use at the Bonifacius mine at Gelsenkirchen, Germany, the installation of Notbohm's patent cage loading mechanism, made by the Siegener Eisenbahnbedarf A. G., which is here described and illustrated.

DESCRIPTION OF CAGER.

The two chain-driven dogs, 1 and 2, which are mounted on the respective tracks, A and B , and which automatically adjust themselves for driving action, are both actuated by a single hand lever, 3, placed in the quadrant, 4, near or in front of the shaft frame and connected with the control valve, 5, and the operating cylinder proper, 6.

This control lever can be placed in any other chosen situation, as determined by

A compressed-air driven device which enables one man to do the work which formerly required from two to eight people. Semi-automatic in operation, this mechanism in conjunction with an inclined landing track, counts off the cars and loads them onto the cage merely by the manipulation of a hand lever.

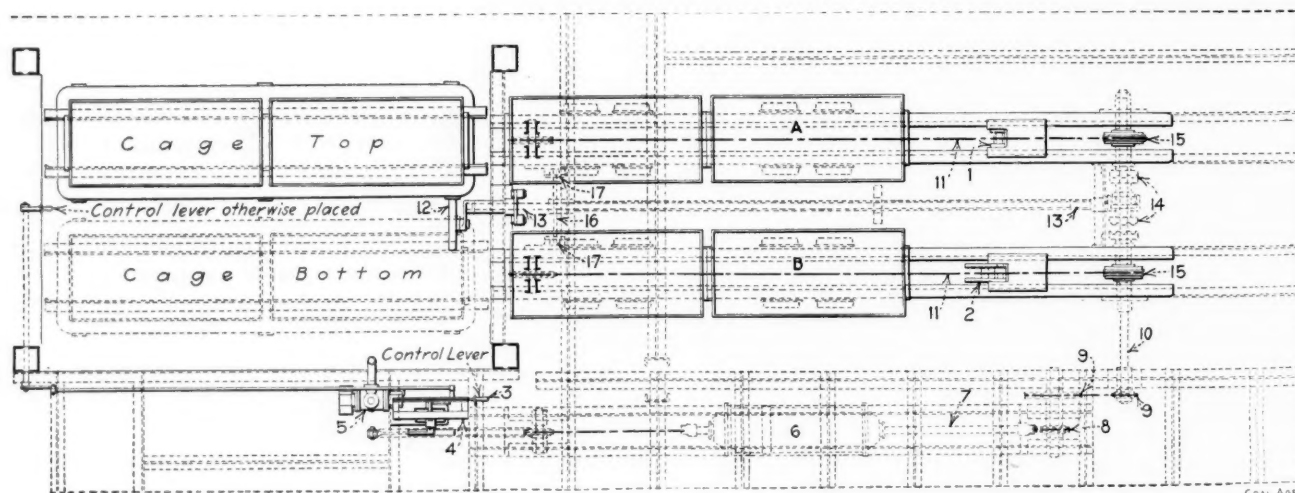
*Translated from the German by E. P. Buffet.

local conditions. The guide rails for the dogs, 1 and 2, are fastened to the platform of the landing and form a guard

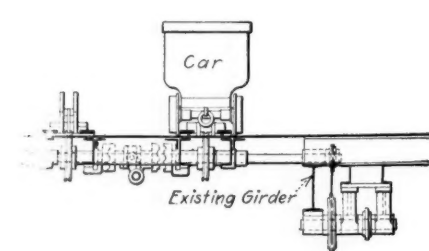
for the haulage cars, so that they are prevented from deviating to the side during their movement. The dogs push directly against the car bumpers. They can, however, be arranged so that they press against the axle boxes under the cars.

The driving mechanism, 6, in this case operated by compressed air, consists of a heavy cylinder with a piston rod, 7, extending through both heads, the reciprocation of which is transmitted by powerful chains, sprockets and shafts, 8, 9, and 10, to the chains, 11, which pull the dogs.

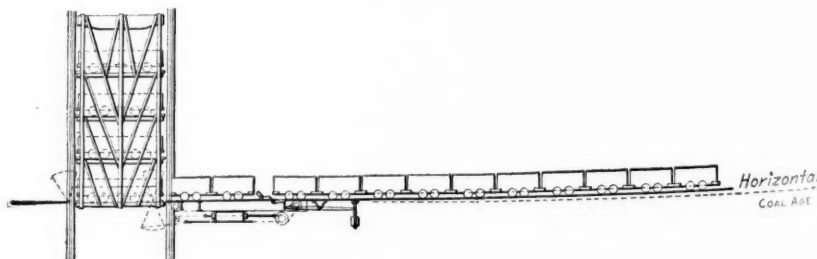
The cage, arriving at the landing, strikes a lever, 12, which, by means of the rod, 13, closes the clutch, 14, in the track, A or B , so as to bring into action



TOP VIEW OF CAGER



SECTION SHOWING CLUTCHES



SIDE VIEW CAGE, CAGER AND LOADING PLANE

one of the sprocket wheels, 15, with its dog-chain. Thus only that dog can be operated at whose track the cage arrives.

At the same time the rod, 13, blocks the cars on the other track by means of the double lever, 16, and the chock, 17, thus affording security against their rolling into the open shaft.

Each of the two cages has four stories and each therefore carries eight cars. While the story of the cage is changed, the driving dog returns to its initial position. As it draws back, it automatically lies down. At the end of its movement, it is released, thereby bringing into action another car-blocking device, 18, at the rear, so that only two cars can roll forward and be run on the cage together.

Each control lever movement corresponds to a certain dog movement. If, for example, the control lever is moved from right to left in its guide frame, the dog on the track now to be used is

period of thrust. The loading is also easy on the cars, since the dog is so formed as to deliver its thrust against their bumpers rather than their thin siding. The caging is quicker than by hand and requires only one man who, meanwhile, operates the shaft signals. By the old method two to eight persons were necessary, depending upon the rush of the work.

This system may be installed without altering the existing structural details of the plant, even perhaps while work is going on. It is alike suited to compressed air, steam or electricity as a motive power.

Necessary Clearances For Shipping Tracks—All Railroads

By A. J. REEF*

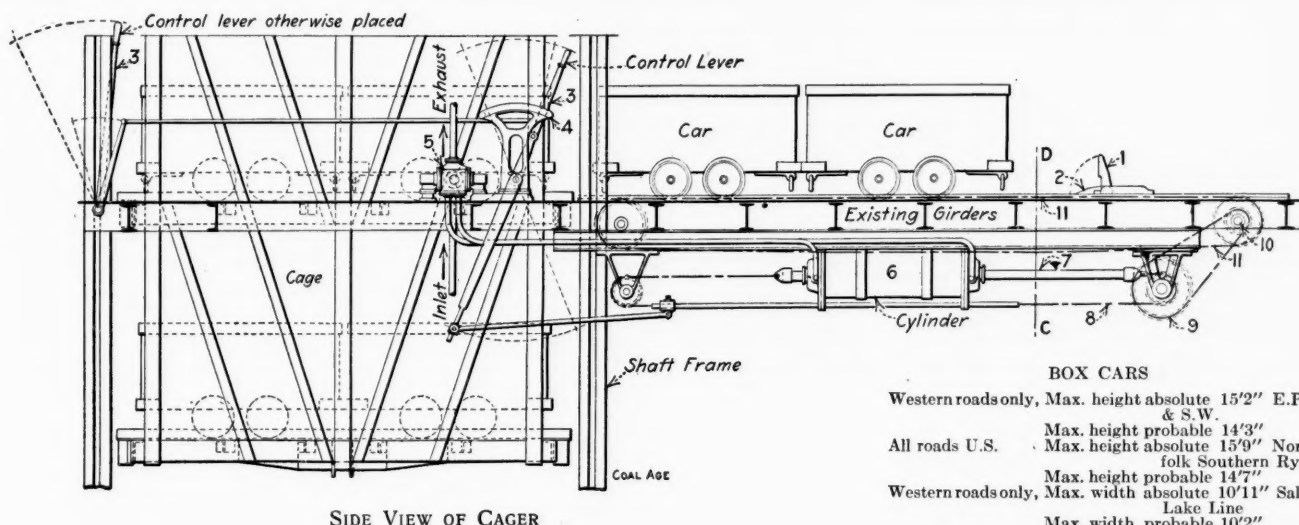
In the design of screening and other mine equipment abutting railroad tracks,

recognized. An overhead clearance of 22 ft. above the top of rail, on tracks for box cars, is highly desirable, and should be obtained even at the sacrifice of some convenience. A horizontal side clearance of 7 ft. on each side of the center line of the track is also desirable.

The observance of the above clearances would obviate many accidents to careless cardroppers on mine sidings, and prevent many damage suits being brought against the mining companies.

Following are the maximum actual heights and widths as taken from the register. The particular road to which the cars of maximum dimensions belong is, also, noted in each case.

"Western roads" are taken as those west of the Mississippi River. "Probable maximum" means that there are enough cars of such size, in operation, to make it probable that any one point will desire to load those cars in preference to cars of a greater height or width.



SIDE VIEW OF CAGER

turned up and travels toward the shaft, driving the cars before it. The other dog meanwhile remains lying down so that the cars can roll over it for the next loading. By a reverse movement of the lever, the dogs are used *vice versa*. The manufacturers state that the push of the dog continues only so long as the movement of the controlling lever, and that when the lever movement is interrupted, the dog movement is also. This seems to mean that the dog stops whenever the lever comes to rest, to accomplish which quite a special air-valve must be used.

The loader, operating the control lever, mechanically moves the cars along either track, quickly or slowly, as required.

ADVANTAGES

A skilled workman is not needed for the task, but by a delicate sense of touch in controlling the car it may be started gently and highly accelerated during the

discussion frequently arises as to what clearance is necessary for box and gondola cars.

To settle such a question, so far as maximum dimensions of cars are concerned, I recently tabulated the over-all widths and heights of gondola and box cars, for the whole United States, from The Official Railway Equipment Register for October, 1912, with the results given below.

The maximum width of car is at the floor line, or the eaves line. The maximum height is from top of rail to top of brake staff. The tabulation from this source, of other car dimensions, as might be needed, would be an easy matter and would prove valuable. The necessary additions to these car dimensions to clear men on the cars, or ground, is, of course, still a matter for individual judgment, but is of more importance than is usually

*Assistant chief engineer, Victor-American Fuel Co., Denver, Colo.

BOX CARS

Western roads only,	Max. height absolute 15'2" E.P. & S.W.
All roads U.S.	Max. height probable 14'3"
	Max. height absolute 15'9" Norfolk Southern Ry.
	Max. height probable 14'7"
Western roads only,	Max. width absolute 10'11" Salt Lake Line
All roads U.S.	Max. width probable 10'2"
	Max. width absolute 10'11 1/2" P. R.R.
	Max. width probable 10'2"
Automobile, Furniture and Refrigerator cars not included.	

GONDOLAS

Western roads only,	Max. height absolute 11'1 1/2" Gt. Northern
All roads U.S.	Max. height probable 10'8"
	Max. height absolute 12'1" Big Four
	Max. height probable 10'9"
Western roads only,	Max. width absolute 10'10" C. & S.-E.P. & S.W.
All roads U.S.	Max. width probable 10'8"
	Max. width absolute 11'2 1/2" P. R.R.
	Max. width probable 10'8"

One part of cement, 2 1/2 parts sand and 5 parts broken stone or gravel is a good composition for the construction of a concrete air crossing. For reinforced work the concrete should not be dry, a "wet mix" should be used. Concrete is easier to lay than brick and does not call for as much skilled labor. Its first cost is less, though it takes more time to lay. It is much superior to timber for air crossings as it is stronger, more durable, almost indestructible and the cost of maintenance is low.

The Bearcreek Coal Co. in Montana

By Benedict Shubart*

From the standpoint of quality, undoubtedly the most interesting field in Montana is that known as the Bearcreek district, lying $3\frac{1}{2}$ miles east of Red Lodge, Mont., and about 16 miles south of Bridger. The field is tapped by the Montana, Wyoming & Southern R.R., which connects with the Northern Pacific at Bridger. The country is quite mountainous. The Red Lodge field is cut off from the Bearcreek by a steep barrier range, but Bridger is reached by an easy railroad grade down. A great deal of the coal has been lost through erosion, and only the lower veins are continuous.

THE COAL

In all, nine distinct seams have been proved. In general the coal pitches to the southwest and the dip is quite variable. The following are the approximate average thicknesses of the different seams: No. 2, 6 to 7 ft.; No. 3, $5\frac{1}{2}$ to $6\frac{1}{2}$ ft.; No. 4, 4 ft.; No. 5, 5 ft.; No. 6, 5 ft.; No. 7, 9 ft.; No. 8, $4\frac{1}{2}$ ft.; No. 9, thickness not determined.

The coal has been classified by the government geologists as sub-bituminous. It is hard, mines out in large lumps, and stands storage in good shape. Its physical appearance is good and it makes an ideal domestic coal. While the field has been known for a great many years, its inaccessibility prevented its development, though coal was dug there by the farmers and teamed over to Red Lodge for many years before the railroad was built into the field.

The first developments in the field were made in 1905 when a number of Mon-

A brief description of an operation in the Bearcreek coal field. This district contains one of the best grades of fuel found in the Northwest. The measures are approximately horizontal and mining conditions are quite favorable.

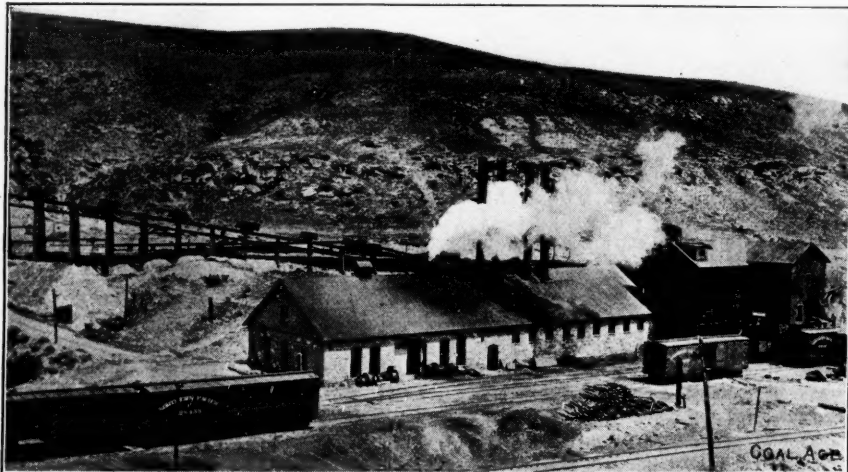
*Engineer, Boston Building, Denver, Colo.

The tipple equipment of the Bearcreek Coal Co. consists of a long let-down car-haul, together with cross-over dumps,

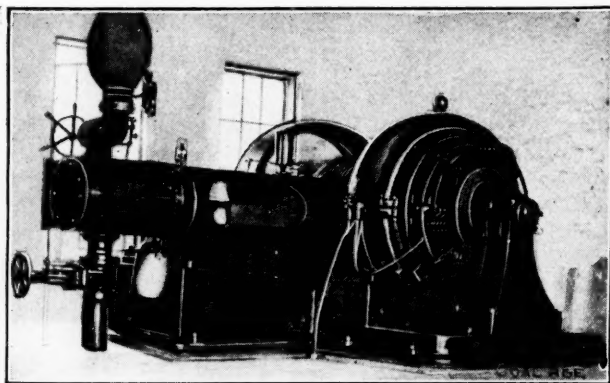
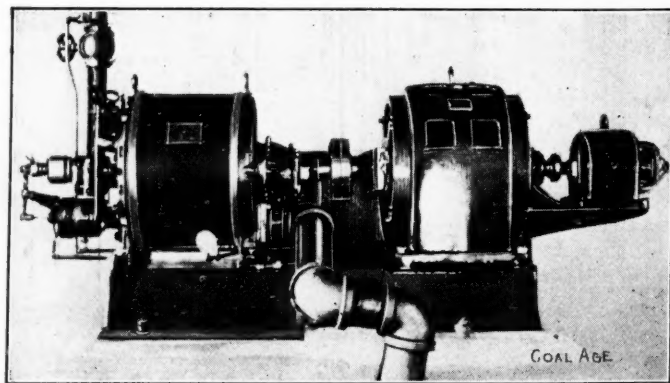
unit, and electric motors for driving the mine fans and tipple equipment. The rack-rail locomotive is used to climb the hill to the No. 2 opening. The grade is comparatively heavy and it was impossible to get a reasonably straight road so that the rack-rail system seemed the most feasible for this work.

SYSTEM OF MINING

The mine has been consistently a mining-machine operation and over one-half the coal is now won by machines. The Goodman chain-breast type is used exclusively, as the continuous cutter or shortwall type has not proven so successful in this field as the breast type. At present, four $7\frac{1}{2}$ -ton single-motor loco-



GENERAL VIEW OF POWER PLANT, TIPPLE AND A PORTION OF CAR HAUL



KERR TURBO-ALTERNATOR AND 150-KW. GOODMAN-RIDGWAY UNIT

tana capitalists, including Chris Yegen, Walter Lamport, Robert Leavens, and others, met with an Eastern promoter by the name of Hall who agreed to build a road into the field from Bridger if the coal were opened up. In the summer of that year contracts were placed for the equipment and the mines were producing coal before the commencement of 1906.

shaking screens and a Victor box-car loader, all of which were designed and furnished by the Link-Belt Co., of Chicago. An electric plant was installed at the same time, the equipment being furnished by the Goodman Manufacturing Co., and consisted at the start of one $7\frac{1}{2}$ -ton single-motor locomotive, one rack-rail locomotive, one 150-kw. direct-current Goodman-Ridgway generating

motives and two 6-ton rack-rail locomotives are used for hauling the coal, while the power plant has been extended to include two 150-kw., 250-volt direct-current Goodman-Ridgway engine-type units; for town lighting a 50-kv.-a., 2300-volt, 3-phase, 60-cycle Kerr turbo-alternator has been installed.

The company is now opening up coal on the opposite side of the valley and

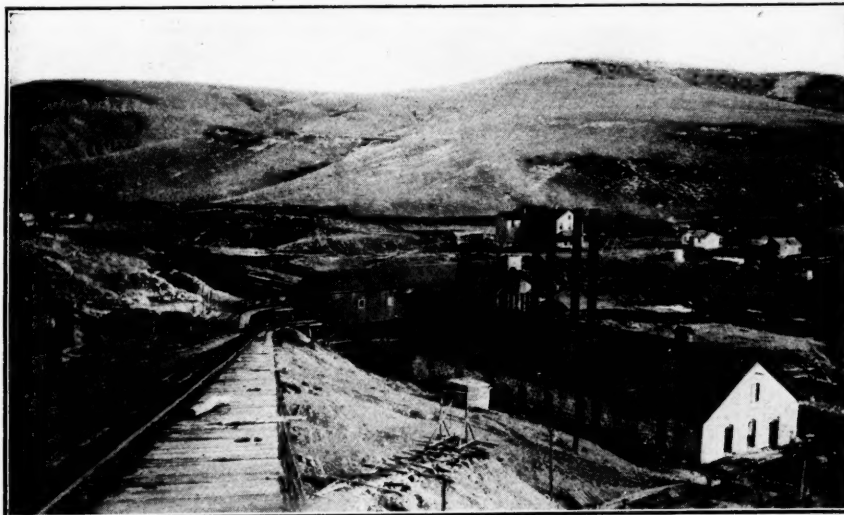
the tipple will be moved this year to the other side, and the old mines connected with it by a tramway. The present tipple apparatus will be installed at the new location.

EQUIPMENT IN TIPPLE

The tipple equipment is quite complete for the production of a clean, well graded

egg, 28.5%; No. 2 nut, 10%; No. 3 nut, 7½%; slack, 10%.

The mines are laid out on the room-and-pillar system, the rooms being 22 ft. wide and from 200 to 250 ft. deep, with pillars of from 15 to 18 ft. thick. The mines are developed for a capacity of one thousand tons per day. The track gage is 40 inches.

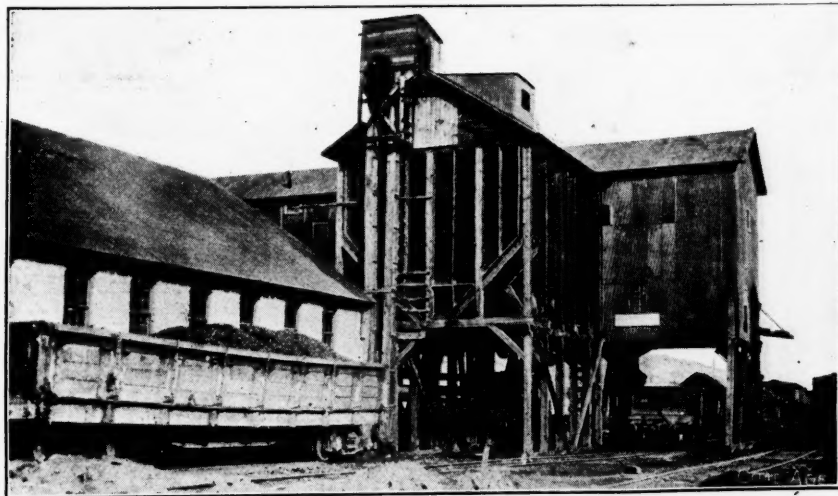


VIEW LOOKING DOWN CAR HAUL TO TIPPLE

lump. The coal is first screened over the shaking screens, the lump and egg coal going direct into railroad cars. The nut and slack is elevated by a massive, slow moving, continuous bucket, Link-Belt elevator, to a revolving screen, where the coal is graded into No. 1 nut, No. 2 nut, No. 3 nut and slack. The entire screen-

The floor is clay, usually very easy for the machine cutting, and where it is possible the mining is done entirely in this clay. Seven Goodman chain machines are used with 6-ft. cutter bars, 45 in. wide.

The cars used were built by the Watt Mining Car Wheel Co. and have the



TIPPLE AND RESCREENING PLANT FOR SMALL SIZES

ing arrangement makes the following sizes: Lump, over 6 in.; egg, 6 in. to 1½ in.; No. 1 nut, 2½ in. to 1¼ in.; No. 2 nut, 1¼ in. to ¾ in.; No. 3 nut, ¾ in. to ⅜ in.; slack, under ⅜ in. It will be seen that when making egg no No. 1 nut is screened. When making egg, thus omitting the No. 1 nut, the coal screens substantially as follows: Lump, 44%;

standard self-oiling type of wheels. They hold about 5000 lb. of coal and weigh about 2200 lb. empty. Depending upon the mining conditions, from six to twelve or more cars are hauled per trip.

When the new tipple is completed, the mines will have a capacity of over 1500 tons per day, and the old openings will be gradually abandoned.

American Coal Finding Favor Abroad

CONSULAR REPORT

Coal is rapidly becoming an important factor in the export trade of the United States. The value of the coal sent to foreign countries in the last fiscal year was 52½ million dollars against 21 million in 1902 and 8½ million in 1892, having thus increased over 500 per cent in the last 20 years and 150 per cent in the last decade. Even these large figures of over 50 million dollars' worth of coal sent to foreign countries in the fiscal year 1912 do not include the value of that passing out of the country in the form of "bunker" or fuel coal laden on vessels engaged in the foreign trade, which aggregated nearly 23 million dollars in value, making a total of over 75 million dollars as the value of the coal passing out of the United States in the fiscal year 1912.

The quantity sent to foreign countries in 1912 was, 17½ million tons, against 7 million in 1902 and 2½ millions in 1892. Thus the quantity exported in 1912 is over 6 times as much as in 1892 and the value about 6 times greater in 1912 than in 1892. Coke exports also show a decided growth, the value in 1892 having been but 112 thousand dollars and in 1912 practically 3 million dollars. A comparison of the quantity and value of coal placed for fuel purposes on board vessels engaged in the foreign trade in 1912 can only be made with comparatively recent years, the figures for bunker coal laden on vessels in 1912 being 7,093,212 tons, valued at \$22,802,876, against 6,003,794 tons valued at \$19,671,778 in the fiscal year 1909, the earliest date for which complete figures of bunker coal movements are available.

The fact that the coal sent to foreign countries has increased 150 per cent. both in quantity and value during the last 10 years, and that the total value of exports to foreign countries plus the value of that leaving the country as bunker coal now aggregates over 75 million dollars suggests that the total value of the coal passing out of the United States in a single year will soon reach the 100-million dollar line.

COUNTRIES MAKING PURCHASES

The movement of coal out of the United States is confined to a comparatively few countries. Of the 2,979,102 tons of anthracite coal exported in the fiscal year 1912, all except 56,571 tons went to Canada; and of the 14,709,847 tons of bituminous coal exported in that year 10,671,982 tons went to Canada, 1,121,580 tons to Cuba, 692,534 tons to other West Indies and Bermuda, 511,802 tons to Panama, 344,712 tons to Mexico,

and less than 1,500,000 tons to all other countries. While the total exports of coal to other parts of the world are at the present time small, the growth in the movements to certain European and South American countries has been rapid.

The quantity of bituminous coal exported to Italy has grown from 43,641 tons in 1907 to 276,467 tons in 1912; to France, from 4,037 tons to 43,222 tons; to Argentina, from 9,827 tons to 156,792 tons in 1912; to Brazil, from 1,610 tons in 1907 to 307,125 tons; and to French territory in Africa, from 500 tons to 102,498 tons during the same period. The total exports of bituminous coal to all Europe grew from 87,512 tons to 404,905 tons; and to South America, from 65,906 tons in 1907 to 580,160 tons in 1912. Exports of anthracite coal to Europe and South America are extreme-

ly small, the exportations of this class of coal being almost exclusively to Canada, and only comparatively small quantities are shipped to Newfoundland and Cuba.

GENERAL IMPORT AND EXPORT COMPARISONS

The average course of import and export prices of coal since 1882 is set forth in the following table, the figures relating to decennial periods and omitting the fluctuations of intervening years. Import prices, based upon valuations in the countries from which brought, have slowly increased. Export prices, based upon wholesale prices in the United States at the time of exportation, show, in the case of bituminous coal, a slight decrease, and in the case of anthracite coal a slight increase. The average import prices of coal at de-

centennial periods from 1882 to 1912 follow:

Fiscal years	Bituminous coal imported, per ton	Bituminous coal imported, per ton	Bituminous coal imported, per ton
1882	\$2.57	\$3.51	\$4.68
1892	3.28	3.07	4.23
1902	2.73	2.53	4.53
1912	2.85	2.55	5.11

SOME LEADING COUNTRIES OF IMPORT

The principal coal-importing countries of the world are: France, whose imports in the latest year for which figures are available were 16 million tons; Austria-Hungary, about 10½ million; Belgium, 7¼ million; Italy, 9½ million; Russia, nearly 4½ million; Sweden over 3½ million; Argentina, over 3½ million; Spain, over 1½ million; China, nearly 1½ million and Brazil nearly 1½ million tons, the average value of these imports ranging from \$3.66 to \$6.60 per ton.

The Lattas Creek Mines in Indiana

By W. C. Ernhart*

The new double tippie at the Monon Coal Company's Lattas Creek mine is located near Jasonville, Ind., on the Chicago, Indianapolis & Louisville (The Monon) and the Chicago, Terre Haute & Southeastern (the Southeastern) railways. The coal mined is the well known No. 4 seam, which is remarkably free from impurities and is the highest grade fuel produced in the state of Indiana.

MECHANICAL EQUIPMENT

This mine is one of the heaviest producers in the state and the method of handling and preparing this large output for the market is modern in every respect. The mechanical equipment consists of six large return-tubular boilers, one pair of 20x36 in. first motion, Crawford & Mc-

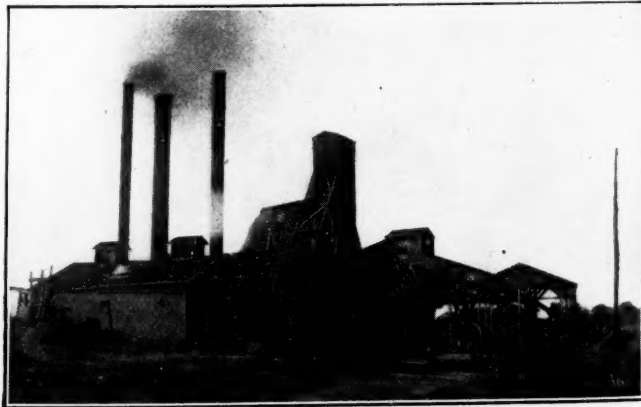
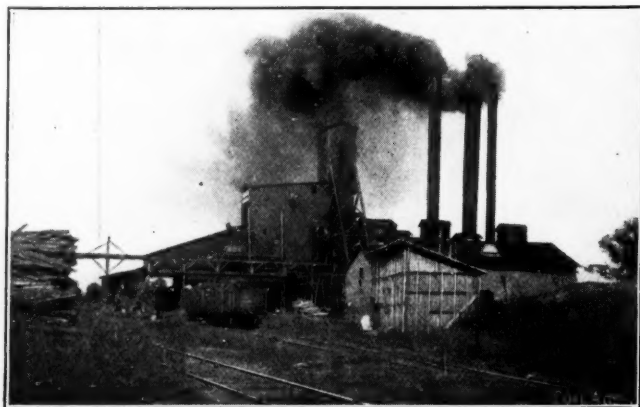
Description of an interesting and modern plant in Indiana. The surface equipment is unusually complete and provision is made for loading on the tracks of two different railroads. The change is effected by throwing over a single lever.

*Engineer, Monon Coal Co., Old Colony Bldg., Chicago.

There is an inclined rock dump with a self-dumping car operated by electric rope haulage, two complete shaker

Prox Engineering Co. of Terre Haute, provides for the loading of run-of-mine, 1¼-in. screenings, 1¼- to 3-in. nut, 3- to 4-in. egg, and 1¼-, 3- and 4-in. lump. Run-of-mine and also bar screened 1¼-in. lump may be loaded without running the shaker screens.

The equipment over the Monon tracks called for special construction, owing to the Indiana contract with the miners, which provides for the payment on a lump-coal basis. This equipment was designed by the Roberts & Schaefer Co. All the coal is dumped over the same gravity screen, weighed in the same pan and conveyed across the tippie; it is then rescreened over a shaker screen and loaded in cars on the opposite side of the tippie on the Monon tracks. The



VIEWS OF THE MONON CO.'S SURFACE PLANT, SHOWING POWER HOUSE

Crimmon hoisting engines, one 200-kw. generator, direct connected to a 20x22-in. McEwen generator engine, one 100-kw. Morgan & Gardner generator, driven by a 16x18-in. Erie generator engine, and one Crawford & McCrimmon 18-ft. fan.

screens, and picking tables, working in opposite directions so as to load on two separate railways. The tower proper is of particularly strong construction.

The equipment on the Southeastern tracks, which was constructed by the

change in loading from one railroad to the other can be accomplished by simply reversing a lever.

In addition to preparing the various sizes required, this construction provides a picking table which permits all slate,

sulphur and other impurities to be taken from the coal before it is loaded into cars for shipment. All together the coal is gone over three separate times, first as it is loaded into the pit cars by the miners, next as it passes over the picking tables, and finally as it passes into the railroad cars.

TIPPLE ARRANGEMENT

When loading coal on the Monon side, it is dumped over the 1¼-in. Akron-shaped gravity screens. A hinged door in the bottom of the screenings chute is raised and the screenings are diverted into a chute that leads to the bottom of a conveyor 20 in. wide.

A tilting chute beneath the weigh-pan leads the lump coal into an apron conveyor, 5 ft. wide, which carries the coal upward and discharges it into the bottom of the picking table. This table conveyor is 5 ft. wide and 45 ft. in length. The coal passes slowly over it and is discharged at the top of the shaker screens. It is then thoroughly screened and sized, and loaded into cars for shipment.

The picking table, slack conveyor, and shaker screens are all driven by a 65-hp. 12x14-in. Atlas engine. A friction clutch on the line shaft disconnects the shaker when it is desired to load run-of-mine or straight 1¼-in. lump over the picking tables.

To prevent breakage the large chute from the bottom of the shaker screens into the lump cars, is operated by an electric hoist. When an empty car is placed for loading, the chute is lowered to near the bottom of the car and gradually raised as the end of the car is filled. The same sizes are made on the Monon side as on the Southeastern.

Emergency Repairs

By F. H. KNEELAND

The colliery master mechanic, or he who fills that position, frequently has his inventive powers taxed by the necessity of performing operations without adequate tools which would be simple enough if proper facilities were at hand.

TURNING A COMMUTATOR WITHOUT A LATHE

To turn up, in a good lathe, the commutator of a small electric motor, is by no means a difficult task; but to accomplish the same result when no lathe is available and the motor bearings cannot conveniently be made use of, is a different proposition.

Upon one occasion the writer was called upon to perform this latter task, and Fig. 1 represents the home-made device which he employed. A was a piece of 1x4-in. strap iron, securely bolted to a wooden framework, as shown. Both ends of this strap were bent up and drilled and tapped for the reception of

the centers B, between which the motor shaft was swung. These centers were merely bolts with long threads, the ends of which were filed down to a point at the proper angle. Each was provided with a locknut to prevent it from "backing out" under the action of the armature shaft while revolving.

The necessary rotation was imparted by means of the rope belt C, which encircled the shaft of a condenser pump as well as the motor armature. When it

field coils of 125-kw. generator, it became necessary to rewind and reinsulate these coils. After canvassing all available sources of supply, two or three rolls of drawing paper, an equal number of rolls of tracing cloth, a few yards of oiled silk and several hanks of heavy fish cord—locally known as "sed line"—were secured as insulating material.

As this was a compound-wound generator, the series coils consisted of copper sheets or ribbons, and their insula-

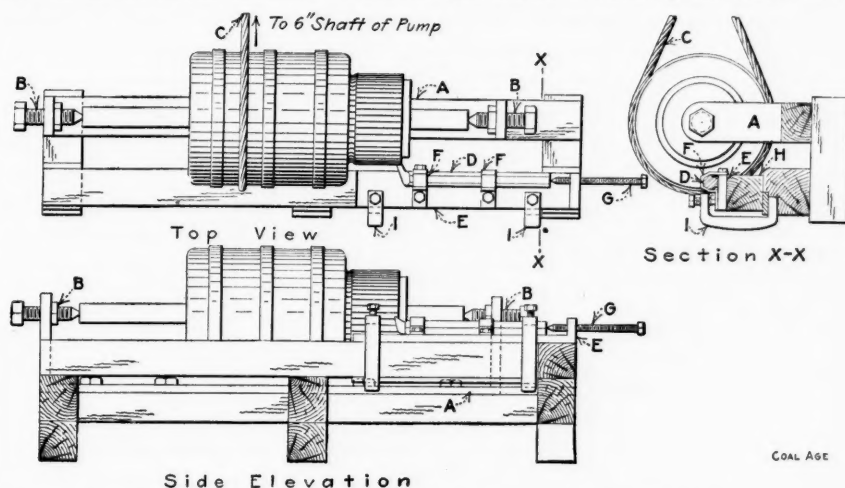


FIG. 1. EMERGENCY DEVICE FOR TURNING UP A MOTOR COMMUTATOR

was desired to stop the latter, all that was necessary to do was to run the belt off of the end of the armature.

The cutting device consisted of the tool or cutter D, made of 1¼-in. hexagon drill steel mounted on a support E, and prevented from rocking by the adjustable guide-straps F. This cutter could be traversed forward by means of the drive-screw G, which was threaded through the bent end of the support. The whole arrangement was mounted upon, and fastened to the wooden beam H by means of the C-clamps I.

The manipulation of this mechanism was extremely simple. The support was first so placed that the cutter would take a small shaving from the commutator and clamped securely in this position. By means of a wrench the screw G was then turned, forcing the tool along the work. When the cut was complete, the drive screw was returned to its initial position. The cutter was then pushed back until its head rested against the end of the screw. The clamps I were then loosened and the support moved over about 1/16 in. for another cut. After tightening the clamps again, the operation was repeated.

This was, of course, an extremely crude device and one upon which many improvements could be made. It possessed, however, one important redeeming feature—it did the work.

REINSULATING GENERATOR FIELD COILS

Upon another occasion, due to the burning out of the insulation on the

tion was not difficult. The drawing paper was merely cut in strips and wound in between the copper bands, the edges of which were separated from the spool ends by paper also. When the shunt windings were reached, however, a new method of procedure was adopted. A sheet of paper, tracing cloth, or oiled silk was used between each layer or row of windings across the spool, as was the case with the series coils, but the fish cord was now wound upon the spool

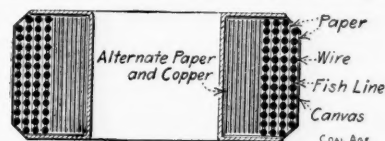


FIG. 2. CROSS-SECTION OF FIELD COIL AFTER BEING REWOUND

simultaneously with the wire. Each separate turn was, therefore, separated from its neighbors, upon either side, by the fish line and an air gap thus formed.

When the wire which had been removed from each spool was thus rewound upon it, the coil was somewhat larger than before and presented the appearance shown in Fig. 2. The whole coil was, however, covered with canvas, put in place, and the machine started. This makeshift winding worked so satisfactorily, that when a new set of coils was received some months later, it was considered unnecessary to replace them, and the new coils were, therefore, held as spares.

Overwind Prevention in England

An interesting form of overspeed and overwinding prevention gear is the Whitmore type, made by H. F. H. King & Co., Ltd., of Nailsworth, Gloucestershire. This overwinder consists of a sensitive parallel ball governor opposing a spring, made adjustable to suit the given conditions of any winding engine. The governor assumes definite positions for each given speed between maximum (usually between 60 and 80 revolutions per minute of the engine) and a speed gradually decreasing to about 5% of the normal in the last two turns of the drum at the end of a wind.

Special Correspondence

This is the second of the series of five articles on this subject.

A type of gear is described which is known as the Whitmore, which like the "Visor" described in the preceding article, makes use of a flyball governor and prevents both over-speeding and over-winding. The brake-adjusting mechanism is suitable alike for post or band brakes.

As soon as this hook engages the overwinder comes into action and first by means of levers, trips the throttle valve through a special gear and then gradually puts on the brake engine. This action is entirely automatic, and in case the driver is incapacitated while the engine is running the cage is gradually brought to rest, three or four turns of the drum before pit bank, and entirely free from any sudden jerk to the cage or undue strain on the rope or drum shaft. In designing the brake engine and the post brakes enough margin of power is allowed to pull the engine up, even if

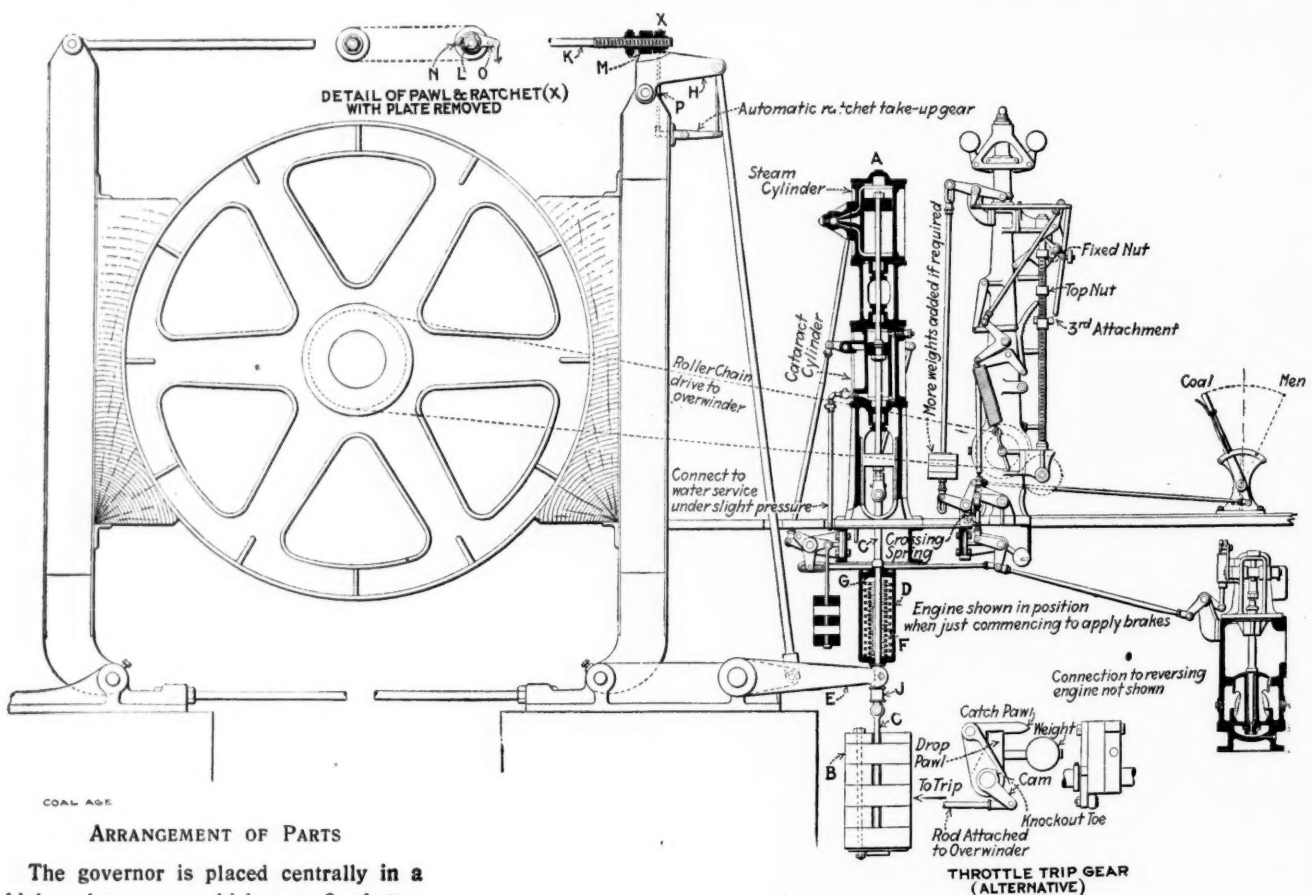


FIG. 1. THE WHITMORE OVERWINDER

The governor is placed centrally in a high column, on which are fixed two screws, driven by roller chains and gear wheels from the drum itself. Each screw is fitted with two index nuts, the bottom or wing nut forming the first attachment and the top nut the second attachment. The screws correspond to the respective right and left hand cages and the motion of the nuts up and down are exact reductions of the travel of each cage. If two drums are used on one winding engine, then each screw is separately connected with independent chain gear to its respective drum.

After the cage has travelled say half to two-thirds of its wind the wing nuts

are level with the speed hooks into which the catch on the nut can engage if the driver forgets to close his throttle valve. The speed hooks as shown in Fig. 1 are curved to a special sweep, and directly controlled by the governor, so that if the engine happens either by reduced steam pressure or an extra heavily loaded cage to be running below its normal speed, and the driver therefore keeps the throttle open too long the second or third catch on the speed hook will engage with the wing nut.

the throttle valve for any reason fails to close.

THE THIRD ATTACHMENT

In the event of the driver slowing down his engine too soon and then putting on too much steam to get to bank a third attachment is provided consisting of a series of fine catches and a steel pawl, that can only engage when the drum is in its two final turns of the wind. If the driver has then too much speed this third attachment causes a spring actuated trigger to be released.

This spring is sufficiently strong to put the brake engine on suddenly and with the full power of the brakes, so that the drum is always pulled up in less than one revolution and brings the cage to rest before the pit bank is reached. The third attachment is operated by the governor but at a slow speed of drum and in practice the governor balls are given free lift or without any spring compression to make its action sensitive.

One great feature of the third attachment is the safeguard when lowering men, as the driver at such times usually lowers at a speed so greatly reduced, that it is quite possible to miss the speed hooks which are ordinarily set for the maximum speed of winding.

THE SECOND ATTACHMENT

On the arrival of cage at bank the second attachment or top nut comes in close proximity to a fixed nut, contact with which causes a quick action to trip the spring catch, so that in the event of the driver forgetting to reverse the engine and travelling too far in the upward direction, the throttle valve is closed and the brake put on with full power.

In usual practice it is stated that if given two feet of latitude for banking purposes, if the cage rises another six inches, the gear automatically comes into action and pulls the engine up before the cage has travelled another foot.

The top nut trips a lever, termed the bridle, clear of a cam in its upward movement so that the spring catch cannot be jerked out of position while the cage is travelling fast in the middle of a wind. Further, in the event of a partial overwind, and the catch being only partly pulled out, the cage on returning to its normal position allows the bridle to wedge itself into correct position and fully engage the catch again.

WHERE MULTI-DECK CAGES ARE USED

On overwinders working in pits where double or treble decking takes place a fourth attachment is added which comes into action in the following manner:—The cage ascends to its top position and then is lowered to its second position. If then, the driver on starting again makes a mistake, and instead of lowering the cage he raises it, with all steam on pistons, the spring trigger is released and the cage brought to rest before the top position.

Many cages have been converted into double deckers with a shortening of clearance between the top position of cage and the safety detaching hook, so that it is necessary to check the momentum of

the drum before the extreme cage position. This type of overwinders have been fitted on engines having only three or four feet of safety hook clearance with double deck cages.

At one side of the illustration near the bottom is shown the steel escapement motion, by which the overwinder, before applying the brake, closes the throttle valve. The pawl further allows the driver to close his throttle if it fails to close by weight, and in any extreme emergency, to again reengage the throttle handle from the operating platform, in order to put steam against the engine, or to again reset the overwinder, after the second attachment has come into action.

The throttle valve often installed by this firm in connection with its winding gears is specially designed to assist the automatic features in firm control. Both high- and low-pressure valves are tripped by the overwinder when this comes into play, and a valuable feature is the action of the throttle as a relief valve, which prevents the possibility of an accumulation of pressure in the steam cylinders should the engine be reversed when running.

A control mechanism sometimes adopted gives further security. This is an arrangement connected to the reversing hand lever, by which, directly the handle is brought towards the central position from either direction, the cut off governor is disconnected from the tripping cams on the valve gear. This enables the driver to put steam against his engine, if required, throughout the entire stroke, although the governor balls may be still extended.

THE BRAKE MECHANISM

It is necessary, in order to complete the description of the Whitmore system of control, to say a few words concerning the type of brake mechanism used as shown in the illustration. The brake engine *A* consists of a steam cylinder and a cataract or dashpot cylinder, this engine being fitted with a floating lever gear by which the position of the piston corresponds exactly to the position of the hand lever.

Weights *B* are suspended by rods *C* from the crosshead of the brake engine. These weights put on the brakes, steam applied under the piston raises the weights and releases the brakes. With this arrangement should any accident occur in the steam main or various engine connections the brakes would go on. Steam is not relied upon to operate them.

The weights would not usually hold the engine against the full steam pressure as this is unnecessary, but they will

hold it against the ordinary winding load as under the working conditions the full load is applied partly by the weight and partly by steam on the top of the piston.

Rod *C* is passed through a spring box *D* which is free to slip up and down. This spring box bears upon the brake lever *E* and a spring or springs, *F* contained therein are compressed between the bottom of the box and plate *G*. Brake lever *E* is connected to the top ends of the brake posts drawing them together. A varying load is applied by the compression of the springs, the weights bringing down with them the top plate *G*, the position of each being controlled by the hand lever. The further this is moved over, the further do the weights and plate descend and thus compress the springs.

The maximum load is applied when the plate *G* is touching the sleeve distance piece in the spring box and the minimum when the collar *J* is touching the underside of brake lever *E*, the springs being then fully extended.

At the end of rod *K* there is placed a ratchet nut *L* mounted in the crosshead *M* of the upper brake lever *H*. This ratchet nut has fitted to it a pawl *N* mounted on a lever *O*. This lever is connected by rod *P* to an auxiliary lever joined as shown to the brake lever *E*, and comprises the take up gear which acts as follows:—On the downward stroke of the brake lever *E* the rod *P* is moved upwards. When this lever and rod are forced down a certain distance, pawl *N* will take up another tooth. On the return or upward stroke of lever *E* the rod *P* will be brought downwards by the lever coming in contact with the collar on the bottom of rod *P* and so screwing up the nut to that extent.

It will be seen that the lever will not be forced down to the position above mentioned by the same load being applied until the brakes have worn that amount. The adjustment therefore is slight at each operation, so that there is only a small difference in the position of the brake piston immediately before and after each automatic adjustment. This mechanism could be applied with equal facility to band brakes.

Keep all rescue apparatus ready for immediate use. Never use oil to ease the running of any part of a mine-rescue device. Use $\frac{1}{4}$ glycerin and $\frac{3}{4}$ water mixed for the oxygen-pump piston rods. Protect all parts well against steam, dust and hot air. Do not pack, for shipment, in sawdust or excelsior or the circulating system will become clogged with dust. Disinfect frequently with formaldehyde fumes, then wipe with a weak solution of ammonia. Do not use hot soda solution on the rubber.

An Isolated Coal Mine in Nevada

By Charlton Dixon *

AN ANCIENT LAKE WIPED OUT BY
VOLCANIC ACTION

It is not generally known by the average miner that there is an immense territory in the western part of the United States which practically contains no mineral fuel and much of it is absolutely without timber. From this great area have been formed the states of California, Arizona, Idaho and Nevada, a total of 465,000 square miles, a space which would contain England, Ireland, Scotland, France, Belgium and Italy.

The coal demand is supplied by Wyoming, Utah, New Mexico, Colorado and far-away Australia. Naturally great efforts have been made and much money expended to discover coal in various sections of this fuel-desert. So far little has been accomplished, a small amount is being mined in California, even that is on the decrease, in spite of main tunnels being painted black to induce effusions of capital from the unsophisticated stockholder.

COAL MEASURES AMID VOLCANIC ROCKS AND DEBRIS

In probably the most unlikely spot of all that country, right in an arid, volcanic desert, an old German prospector discovered a field of coal of fair quality. This man was well known in the mining regions of the state by the name of "Jack-Ass Billy," on account of an animal of that genus and gender being his only steady companion for many years. Up to that time, no coal was known to exist in the state of Nevada.

Gold, silver, copper, iron, besides several other minerals, are being mined in generous quantities. That these should be encountered is natural, as the mountains which contain them are mostly of volcanic origin, but to find coal sandwiched in between two ranges of an origin wholly Plutonic and covered deeply by the product of their volcanoes is out of the ordinary. The western range is known as Silver Peak, the eastern as the Monte Cristo. Along the flanks of the former is the outcrop of the coal deposits, in which is the mine under consideration.

COAL BEDS NEAR TONOPAH AND GOLDFIELD

The opening is situated three miles southwest of Coaldale, 42 miles northwest from Tonopah, 62 miles north of Goldfield by way of the Goldfield & Tonopah R.R., which runs through Coaldale in the middle of the valley formed by the aforementioned mountain ranges. At the southern extremity of the Silver Peak, a Pittsburgh company is mining gold. About eight miles away, at the northern end of the same short range of mountains, a Pittsburgher is mining coal.

Naturally a coal man at his first visit

In a region, where volcanic rocks are almost universal and where minerals and precious stones are found in quantity, stratified rocks, the remains of an ancient lake, mysteriously occur. In these measures, five distinct beds of bituminous coal are found. The sulphur content of this fuel is about one per cent. and it is almost all in the form of gypsum.

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will be interested in the surface indications. Here he will scrutinize the float in vain for the familiar signs of a coal field. Not a stone or pebble will he find that has escaped the baptism of fire. As he plods his way across the desert, pieces of varied colored tufas, rhyolite, quartz, petrified wood, magnetite, borax, gypsum, chalcedony, sulphur, variscite, agate, selenite and many others, will meet his eye, which is questionable company for a decent piece of coal to be found in.

Not a sample of the familiar strata which almost always accompany coal will he find, with the exception of calcareous shale, which, having been subjected to intense heat, is scarcely to be recognized. The detritus from the mountain, independent of the mountains themselves, constitutes a veritable paradise for the student of geology and its subordinate studies, mineralogy and petrology.

Instead of birds, chipmunks, rabbits and black snakes, he sees horned-toads, lizards, gophers, jack rabbits and rattlesnakes. In place of grass, brush and trees, there is nothing but a few scattered patches of sage brush. On the mountain sides there is not a vestige of vegetation. The general aspect of the district, to say the least, is depressing.

THE SLAG DUMP FROM THE CASTING OF A WORLD

Arriving direct from the Truckee Valley at Reno, one seems to have traveled in a geological sense many centuries into the past. One writer describes that part of Nevada as being the slag dump from the casting of a world. No one who has been there will attempt to contradict him.

The foothills being reached, indications of the carboniferous period come into view. Here are upturned edges of calcareous shale strata with interbedded water-deposited tufas, which have had a volcanic origin. The coal appears in these measures.

The beds represent periods of deposition of carbonaceous matter at the bottom of what was evidently the bed of an ancient lake, which existed anterior to the general upheaval which produced the two adjacent mountain ranges. These constitute the most important topographical feature of the district in which the coal property is situated.

The coal dips to the northeast at an angle of 30 to 45 deg. Many local variations of dip occur, however, in the sedimentary formations. There are five distinct beds, the most important features of which, as far as developed, I will give in order of their location downward.

TWO BEDS, AT LEAST, ARE PROMISING

Bed No. 1, or the upper seam, is known locally as the Groetzinger. A slope has been driven down on the bed a distance of 200 ft., and it shows about 3½ ft. of very hard coal, containing a rather high percentage of ash. Two laterals, one on each side, have been driven to a distance of 100 ft. from the slope. These demonstrate a considerable regularity in the deposit as to thickness and quality.

Bed No. 2 occurs 50 ft. below, and shows 12 to 15 ft. of interstratified bituminous shale and coal. A slope sunk a short distance on the bed shows a remarkable improvement for the few feet driven. It is hard to determine how far bed No. 3 is below bed No. 2, on account of the twisted and folded intervening strata. Scarcely any development has been done on it, but the nature of the deposit is similar to No. 2. Bed No. 4 was first reported to be on the west side of the anticlinal, but subsequent development has proven this to be an error. Little is known of bed No. 5, its outcrop being masked by volcanic matter.

THE WILSON BED IS THE BEST IN THE BASIN

No. 4, or what is known locally as the "Wilson seam," is from 5 to 7 ft. thick, and consists of semibituminous coking coal of good quality. It is the only bed now being developed. The field is supposed to contain about 900 acres.

A mile to the southeast of the Coaldale mine, a slope has been sunk on the coal which pitches there at an angle of 60 deg. to a depth of 300 ft. The coal averages 6 ft. in thickness, the quality improving with depth. At the former opening there is 6 ft. of good coal. The lower half has the appearance of a semi-anthracite, being very slick and hard.

A sample taken from the face of the slope, while yet in the crop, analyzed as follows:

ANALYSIS OF WILSON BED

Moisture	0.20
Volatile matter	32.80
Fixed carbon	56.00
Ash	10.00
Sulphur	1.09
Total	100.00

Nearly all the sulphur is in the form of calcium sulphate (gypsum), and not in the formidable shape of pyrite. The above analysis compares favorably with those of many Eastern coals.

The exceedingly small percentage of moisture in the fuel (less than in the best anthracite), is due, no doubt, to the volcanic action in the vicinity during its transformation into coal. Moreover, it was covered to a considerable depth by molten matter, which is now represented by the rhyolite formation.

DESCRIPTION OF THE MINE

The main slope has been carried down to a distance of about 250 ft. along the bed; a heading on each side is being driven. Everywhere the coal shows an average thickness of six feet. The hanging wall is exceedingly firm, arguing well for an extraordinarily low timber cost.

What strikes an Easterner most forcibly in this mine is the extreme dryness. No moisture gathers on the walls, nor on the timber. The fireclay bottom has been subjected to a high degree of heat. Attempt to mold it with water failed. Much sulphur and gypsum were encountered at the portals.

As a temporary arrangement a 15-hp. gas engine is taking care of the material. The pitch is about 30 deg., but is irregular as is generally the condition so near to the crop line. The present opening will eventually become the airway. A permanent plant will be built a few hundred feet further to the northeast on a flat more suitable for sidetracks and the necessary concomitants of a coal-mine operation.

AN OPERATION WITH NO ACTIVE COMPETITOR BUT THE WOOD PILE

By virtue of its unique position, it should enjoy a large measure of financial success. It has no competitor within 1200 miles worthy of consideration. It is just that distance nearer the Pacific Coast than any other. The only coal to dispute its complete acceptance is the Australian which, judging from appearance, is not equal to the Nevada product.

The home market from Reno to Goldfield demands about 20,000 tons annually. The cheapest coal purchasable in Goldfield today costs \$15 per ton. Territory beyond this limit can be reached on the north by the Southern Pacific R.R., and on the south by the Salt Lake, Los Angeles and San Pedro Railroad.

Demand will steadily increase in the local market area, as hundreds of people who now use wood will then use coal. At present wood is the cheaper, but the opening of a mine close to the market will shift the balance so that the use of

coal will be the more economical. Such a price can be made as will secure this market and yet give the operator a handsome profit.

WILL MAKE A GOOD COKE

Many operations now closed down will resume just as soon as they are assured of a steady fuel supply at a reasonable price. By crushing and washing the ash and sulphur can be almost entirely eliminated, leaving a product of nearly the same chemical analysis as the famous Connellsville coking coal.

Should it make a good coke for metal-

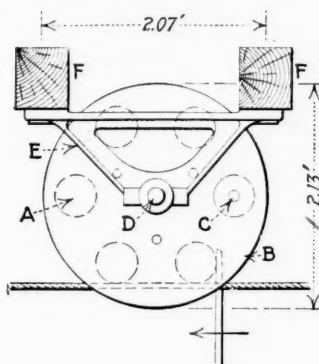


FIG. 1 RIGID OR FIXED STAR ROLLS

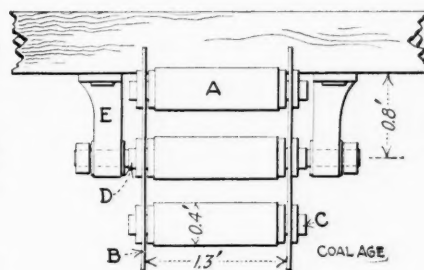


FIG. 2

lurgical purposes, it will be an incalculable boon to the whole state. Smelters could be built close to the mine with impunity, as injunctions against them for deleterious fumes need not be feared. By smelting the ores in the neighborhood, a tremendous saving would be effected for the operators, particularly the smaller mine owners, who often, after paying freight and other charges, find themselves minus their ore and plus a bill against them.

Another source of demand will be the railroads, the locomotives of which all use oil for fuel, but other things being equal, coal is preferable. Already the officials have intimated their readiness to change.

This coal has already proven itself to be a satisfactory domestic fuel when properly prepared. Those who have tried it are well satisfied, besides being jubilant over the future prospect for cheaper coal.

POSSIBLE CENTRAL STATION WITH LONG-DISTANCE TRANSMISSION

Another possibility is the installment of a high-tension electric plant, capable of supplying current for a distance of 50 miles. This would embrace the operations of Goldfield, Tonopah, Manhattan, Silver Peak, Miller, Columbia, Candelaria and other points. Much of the slack could be used in this way. Looking at it from any standpoint, its isolated position, its volcanic surroundings, its utility, its opportunities and possibilities for good, or as a financial venture, this coal mine in Nevada is a marvel.

Bohemian Cable Guide Rolls for Vertical Curves of Haulage Roads

BY GUSTAV RYBA

At the "Julius III" mine, in Brúx, Bohemia, the cable roads have smooth overhead ropes. The lay of the seam causes various grade changes, some convex and others concave. In the hollows the rope when tight tends to pull out of the forks or clutches, letting go of the car, which on a steep enough grade may run away, jump the track, derail the succeeding

cars, and shut down the haulage system. To prevent this, there must be provided in such hollows "down-pressure" or guide rolls to keep the rope from leaving the clutches, which, however, must not hinder the free passage of the cars. For this purpose star and automatic down-pressure rolls are used.

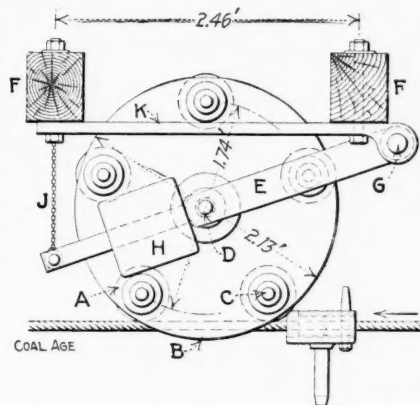


FIG. 3. MOVABLE OR YIELDING STAR ROLLS

The star rolls are of two types, rigid and yielding.

RIGID OR FIXED STAR ROLLS

The star rolls, Figs. 1 and 2, comprise six individual rolls *A* regularly spaced in a circle between two iron disks *B*. These small rolls are of iron or wood, the wood being less durable but protecting the rope better. The six rolls can

Note.—Abstracted from the "Zeitschrift des Zentral-Verbandes der Bergbau Betriebsleiter," Sept. 15, 1912.

each rotate on pins in the disks, while the system may revolve in bearings *D* on brackets *E*, fastened to beam *F*, secured to the roof.

This star roll allows the cable to glide over or rather under it, the whole system revolving. When a car approaches, the clutch may strike against one of the six rolls, turning the system about *D* while the fork of the clutch enters between the two lower rolls, passing out with the further rotation of the group. If the clutch should happen to arrive between two rolls, it need not touch at all as the car goes by. If it chance to strike a roll, still the passage is smooth. It may, however, befall, where the cars are close together, that a succeeding car finds the star roll still spinning with momentum imparted by the previous car. Then it is possible for the fork to encounter one of the descending rolls with an endwise thrust, which throws the clutch off the

first one, its wheels pass over a double lever, close to the rails, the depression of which actuates a leverage mechanism which lifts the roll clear of the clutch. The neighboring roll meanwhile holds down the cable. Then, as the car reaches the second roll, it is elevated by a similar mechanism, while the first roll which has returned to position, keeps the rope in place. Account has to be taken of the cable velocity in determining how far the second roll should be spaced from the first in order to allow that the first shall have had time to descend before the second rises.

A device acting upon this principle, but permitted by local conditions to be simpler in construction than the one at the "Julius III" mine, is installed at the "Marien-Stollen," in Schwarz, Northwestern Bohemia. It is shown in Fig. 4.

All of the roll devices here described are made by the Maschinenbau-Aktien-

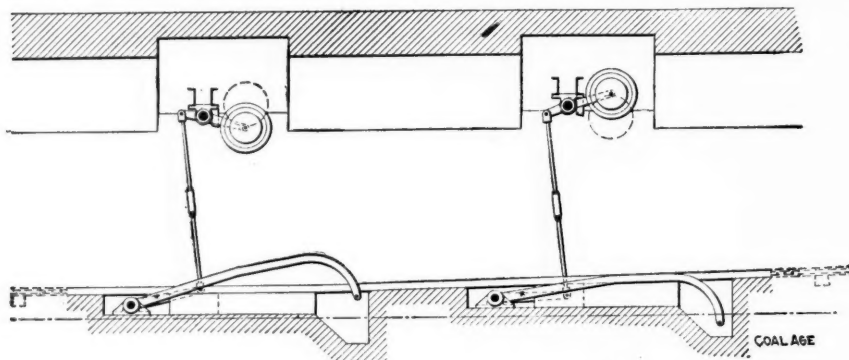


FIG. 4. AUTOMATIC DOWN-PRESSING ROLLS

cable. For this reason there is an advantage in using yielding star rolls, which in such event will rise.

YIELDING STAR ROLLS

Their design, Fig. 3, is for the most part similar to that of the fixed rolls. The main axle *D*, of the system, however, is held by two movable arms. Each arm *E* is pivoted about a common axle *G*, which is fastened to the carrying beam *F* by metal straps *K*. On the arms *E* are sliding weights *H* in order to adapt the force with which the roll system presses down on the rope to the latter's tension. To limit the downward movement of the roll system, the arms *E* are connected with the beams *F* by chains. The degree of inclination of the arms is important and should be such that the direction of the rope forms an acute angle.

AUTOMATIC DOWN-PRESSING ROLLS

There are also in use at the "Julius III" mine rolls for the purposes already mentioned, which are automatically elevated out of the way of the clutch when the car passes. These are simple iron rolls arranged in pairs, weighted to hold down the cable. If the car approach the

gesellschaft, formerly Breitsfeld, Danek & Co., of Aussig, Bohemia.

It would seem that guide rolls acting on this principle might be used on gentle horizontal curves, as well as on vertical ones.

Successful Mine Foreman from Four Viewpoints

By H. LAVIERS*

At the close of the year, we are apt to look solely at the number of dollars and cents of profit we have made and to overlook those less tangible assets which have or have not been created. The gains not thus susceptible of calculation are better organization, improved equipment and improvement in the condition of the mine.

It is very largely by these intangible gains that we must judge the mine foreman. We may look at the outcome of his work the viewpoints of the miner, foreman, engineer and manager.

A good mine foreman will have created that valuable asset, the respect and con-

*Manager North-East Coal Co., Paints-ville, Ky.

Note—Abstract of paper read at winter meeting of Kentucky Mining Institute.

fidence of his men. They will have learned to know that their welfare, financial interests and personal safety are his daily concern. He will have arranged his work, so that what was done yesterday will not have to be undone tomorrow perhaps at greater cost than it might have been accomplished in the first instance.

He will have inaugurated a plan which will permit the ultimate extraction of all the coal in the territory being worked and he will have made his roads so straight that haulage will not be difficult and slow. The roads will be well laid, the rooms well but not excessively timbered, so that in the succeeding year or in years to come the extraction of coal will not become increasingly difficult through any negligence of his. He will have given even better attention to places about to be exhausted, though these are usually the hardest places to visit and hence he will have arranged that equipment and material bought and paid for will not be buried beyond recovery or left to rust and decay.

He will have created lastly ideals in the camp of order, self-respect, harmony and safety. As "like begets like," the character of the foreman permeates throughout a mining village. These all are assets not to be entered in the mine journal but of extreme value to anyone who would operate the plant.

A Double Acting Hacksaw Blade

The accompanying engraving shows the tooth layout of a new hacksaw, which is being placed on the market by Alexander Reitlinger, 201 William St., New York City.



LAYOUT OF TEETH

The claims made by the manufacturer for these saws are that they will cut faster and cleaner than when made with the teeth all in one direction, and that they will cut iron pipe without breaking the teeth. When used in a power-driven frame, it must be one which does not lift on the back stroke, as with this saw both strokes are cutting strokes.

A French method of shaft sinking through water-bearing strata is to drill six holes in a circle around the site of the proposed shaft. When this is done a cement grouting is pumped through the holes into the fissures, this filling all interstices. The shaft is then put down as if through solid rock.

Electric Hoisting in Great Britain

George Hann, of the Powell Duffryn Collieries in South Wales, has had more than usual opportunities for determining the relative merits of the various systems of winding at collieries, and some remarks of his, contributed to a discussion on "Electric Winding, with Special Reference to Deep Shafts," at the Midland Institute of Mining, Civil and Mechanical Engineers, are deserving of attention.

He does not advocate the use of electric winding engines where steam is already available for the purpose, although conceding the point that when the winding peak loads are only a small proportion of the total load of the colliery it may be advisable. He also believes where there is waste gas from coke ovens or exhaust steam available in sufficient quantity electricity should be generated to supply all the other machinery, which must necessarily be at a distance from the boilers.

POWER REQUIRED

Most new collieries exceed 700 yd. in depth, and their output from each shaft must be estimated for at least 3000 tons per day of eight hours winding. To do this, taking a colliery 730 yd. deep and 6 tons of coal per wind, the maximum load amounts to 4500 hp. and the average input into an Ilgner converter when making one complete wind per minute is 1800 hp. The other plant required at the colliery when fully developed will be about as follows:

	Day shift (horse-power)	Night shift (horse-power)
Fan.....	500	500
Compressor.....	500	250
Screens.....	80	
Shops.....	40	
Various machines (creepers, etc.).....	60	
Surface plant.....	50	
Haulages (average).....	250	
Pumps.....		600
Totals.....	1480	1350

Mr. Hann favours the Ilgner system as against the Brown Boveri system. The latter may be cheaper in first cost than the Ilgner system, but he maintains that no form of electric winding is a sound proposition when the steam boilers are situated at the colliery where the electric winders are to be used, except when the colliery site is so bad that it is not possible to have the boilers and winding engines adjoining one another. The arrangement of the main winding engines and air compressing engines, driven by steam and exhausting into mixed pressure turbines, is more economical in first cost and also in cost of running than any electric system.

He further states that the province of the electric winder is confined to the colliery where the boilers can be entirely

Special Correspondence

An interesting discussion of the present status of the electric hoist in England, in which some valuable cost data are presented. Where central power plants are employed this type of winding is meeting with considerable favor.

eliminated and the generating plant concentrated at existing neighbouring collieries, where preferably the bulk of the power can be obtained from either coke oven gas or exhaust steam, supplanted by a supply of live steam.

Then the economy due to the concentration of boiler and generating plant is considerable and will be felt chiefly during the hours when the collieries are standing. Where power can be obtained from a power company, the all-electric system will be no cheaper than the steam-winding engines with exhaust steam turbines, unless the supply of power is exceedingly cheap; the price should not exceed 5c. per unit delivered at the colliery.

SOME OF THE DISADVANTAGES

In a contribution on the subject, James A. Watts of London, expressed the view that figures would show electric winding in a somewhat unfavorable light. Approximately an up-to-date steam winder will develop one boiler hp. for 30 lb. of steam and subsequently the turbine will give one hp. for 40 lb. of steam, the final combined result being a consumption of 17 lb. of steam per boiler horsepower per hour.

It is doubtful if the consumption with electric winding is as low as this with the inferior load factor at a central colliery power station, and if the electric consumption is not less than this, the capital expenditure for equipment is much greater in the large majority of cases. Steam winders and mixed pressure turbines have been decided upon for the Ghrone, Clifton and Kersley Collieries so it seems that this combination is not the chief enemy of electric winding, but the successful rival, which is a distinction with a big difference. The control of electric winders must also be greatly improved before the shock on the winding rope is less than with a steam engine.

Replying to this discussion, F. Thursfield stated that he has taken a number of large winding plants and definite quotations from well-known firms, and finds they come within much closer limitations than he expected; they all

show between \$73 and \$122 per shaft horsepower. Taking \$97 as an average figure and assuming that the plant works 2400 hours per year, and allowing 10 per cent. interest on the capital for maintenance and depreciation, this gives 0.456c. per ton per 1000 ft. for capital charges. Assuming an average shaft deficiency of 50 per cent., one unit will raise a ton 600 ft., so that with electricity at 1c. per unit the cost will be 1.67c. per ton per 1000 ft; in round figures the capital charge amounts to 2c. per ton per 1000 feet.

ROPE BREAKAGE

The question of Koepe pulleys is a most important problem in connection with winding. The results of Mr. Thursfield's investigations show the great advantage of the Koepe pulley, but when pulleys are introduced the question of breakage crops up. The breakage of a rope is a rare thing and an accident that should not happen in a well-supervised mine.

The question of rope failure, however, is not of great importance and to some extent is offset by the fact that the rope will slip in case of great strain being brought upon it; but the slip is less with electric winding owing to the more steady turning movement. There appears to be no reason why the speed of the winders should not be increased and the size of the rope reduced if it can be shown that the motion is steadier and the strain on the rope less.

In questions of working cost, as regards a new colliery, Mr. Thursfield says they must look a little to the future. It will be conceded that a well-designed electric winding scheme will have a lower fuel consumption than a steam winder. There is, moreover, a probability of the poorest of fuels increasing in value in a few years, due to improvements in stoking, increasing ashpit draughts, possibilities of briquetting in connection with coke manufacture and producing gas, and so forth.

An important factor in the problem is the concentration of plant. If the whole of the generating plant can be removed from the pit shaft it will be a great improvement in the design, and much better for the upkeep and maintenance of extensive machinery.

The detection and estimate of the quantity of gas product in a mine does not depend so much upon the lamp or the oil used as upon the observer. A person with good eyesight should be able to see a 1½ per cent. cap. When a 2½ per cent. cap is not detected, something is wrong with the eyesight or powers of observation.

A New Mining Machine

By RALEIGH C. TAYLOR*

The Hess Dustless Mining Machine Co., of Ansted, W. Va., are developing the new type of coal cutter which is shown in the accompanying illustrations. The overall dimensions of this machine, exclusive of the cutter bar and starting box, are approximately, length, 5 ft.; width, 2 ft.; height, 19 in.; while the weight is estimated to be about 1500 lb.

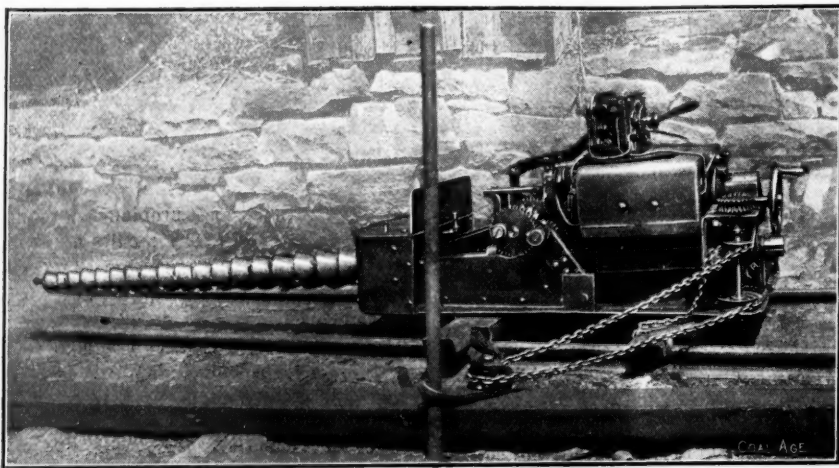


FIG. 1. LEFT SIDE OF MACHINE, SHOWING GEARS AND DRIVE CHAIN

The cutter bar is a cone-shaped spiral casting either of iron or steel, about 5 ft. long, 6 in. in diameter at the butt, and 2 in. at the tip. The cutting bits, which may be clearly seen in the illustration, project about $\frac{1}{2}$ in. upon either side of the casting, thus increasing the cutting diameter about 1 in. The center or tip bit also adds approximately 3 in. to the length. The weight of the bar is about 200 lb.

HOW THE MACHINE IS TRANSPORTED

The machine is always moved from place to place with the cutter bar detached, and it has been found that this can be very easily and quickly accomplished without mechanical devices other than the winding arrangement shown on the end of the truck in Fig. 2 for loading the machine thereon.

The cutter head is screwed with two or three turns onto the forward end of the main shaft, so that their center lines are coincident. This main shaft is supported by suitable bearings on the bed-plate and so located that the cutting bits revolve just clear of the floor but close enough to remove all the coal.

A 15-hp. motor is employed for driving purposes. This is placed in the upper part of the housing so that the pinion on the armature engages the gear wheel on the main shaft. The ratio of reduction is such as to drive the cutter bar at a speed of about 300 r.p.m. In addition to this motion of rotation, the

*Ansted, W. Va.

bar and main shaft move backward and forward in a direction parallel to their common center line for a distance of 3 in. and at a speed of 20 full strokes per minute.

The cutting effect of the bar is, therefore, that of a saw and auger combined. This reciprocating motion also has a tendency to lessen the number of bits necessary and to remove the difficulties that might arise from the loss or breakage of one or more of their number.

From readings taken while the machine was at work, it was found to use from 10 to 15 amperes of current while holing in, and from 15 to 20 amperes when cutting across the face at the rate of 15 in. per min. With this speed, the machine cuts a 25-ft. place in from 25 to 35 min., including holing in (which takes about 3 min.), setting jacks, etc.

Absolutely no dust can be detected in the atmosphere of the place while the machine is at work. This is largely because the cuttings are not pulverized but are chipped off in rather coarse grains. A sample of the "bug dust" made by this cutter has shown that only 18 $\frac{1}{2}$ per cent. will pass a 20-mesh sieve.

The machine is composed of but few parts, and these are strong and durable. Worm and spur gearing are used exclusively, and the power required compared to the amount of work done is reduced to a minimum. The tapered shape of the undercut makes the coal easy to shoot, and at the same time the amount of slack, or cuttings, is much less than is made by a puncher. Props can be set within 6 ft. of the face without interfering with operation, and as this machine is light in weight, the amount of manual labor required in its manipulation is correspondingly small.

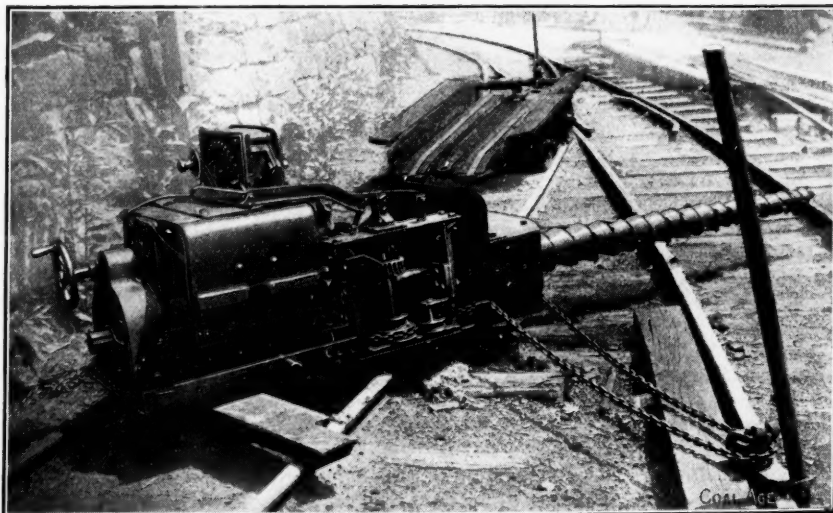


FIG. 2. RIGHT SIDE OF MACHINE, ALSO TRUCK ON WHICH MACHINE IS TRANSPORTED

HOW THE MACHINE IS OPERATED

After being "holed in" for the full depth of the cutter bar in the left-hand corner of the room, the machine is moved across the face by means of the chain drive shown in the illustration, making a continuous undercut from rib to rib the full depth and size of the cutter bar, the bottom of the machine, meanwhile, sliding flat upon the floor.

During this process, the machine is held approximately at right angles to the face by the chain, regulated, when necessary, through the hand-steering device shown at its rear end.

Electric Shotfiring

The important points to be kept in mind in electric firing are: (1) See that all connections and joints are correctly made; (2) see that the ends of the wires are scraped before connection is made; (3) make the connection of the firing cable and the exploder the last act before firing; (4) disconnect the firing cable immediately after firing; (5) do not touch the exploder terminals while firing; (6) the handles of the exploder should revolve at maximum speed when pressing the firing switch.

Coal Mining Institute of America

Special Correspondence

The Coal Mining Institute of America reached a distinct high-water mark at its winter meeting, which was held on Dec. 18 and 19, at the School of Mines Building of the University of Pittsburgh. Not only did the attendance exceed expectations and threaten to overflow the audience room provided, but the technical character of the papers presented exhibited the fact that the institute is no longer content to deal in the small-talk of mine management.

On the first day, W. E. Fohl being in the chair, William Seddon opened the meeting by reading his "History of the Coal Mining Institute of America." Mr. Seddon was the first secretary of the institute and has been identified with it for many years. In the afternoon, Eugene B. Wilson delivered an interesting address on the "Clinkering of Coal Ash," and while some objection was taken to the conclusions drawn, the paper was certainly one of the most interesting of all the papers presented.

MOISTURE IN COAL

One speaker objected to Mr. Wilson's statement that the reason why moisture in coal was undesirable was owing to the loss of heat in dissociation, declaring that it was unlikely that much of such dissociation could occur, as the moisture was driven off before much heat was obtained, and because the requisite temperature was not reached in a furnace.

Moreover, such dissociation, if it occurred, would be immediately reversed as soon as the gases thus formed reached a zone of lower temperature. This is undoubtedly true. Water is vaporized at lower temperatures than 2730 F. which, according to M. Pouillet, furnishes a dazzling white heat in a fire. This temperature is not sufficient for dissociation. On the other hand, there is no possibility that the parted gases could possibly travel up the stack without re-association. So the loss due to moisture is confined to the heat-loss on evaporation.

R. D. Hall's paper followed on the "Effect of Shear in Roof Action," and it is interesting to note the different attitude assumed to the theory that the roof is a monolith to that at a previous meeting of the institute. Perhaps this change was largely due to a new personnel, as those who spoke favorably of that conclusion, among others, Chas. Connor and Rufus J. Foster, were not present at previous discussions. The figures on the shearing stress of rock, while not discussed at the meeting, should be extended to cover strata found in mines before complete acceptance is given to the statements made. There is need for a series of experiments on the strength of the rocks of the Carboniferous series.

The institute held a more than usually successful meeting, discussing technical problems rather than mine management. Wilkes-Barre is proposed as the location of the summer meeting. W. E. Fohl was elected president for the ensuing year.

DEARTH OF LABOR OR DECLINE OF EFFORT

The President, A. W. Calloway, general manager of the Rochester & Pittsburgh Coal & Iron Co., who had, up to that time, been unable to be present, then read his address, in which he discussed the general loss of efficiency of the mine worker. He declared the shortage of labor to be a deficiency not so much of men as of energy, for the present-day miner was not willing to do as much work as formerly.

H. D. Palister, of Pennsylvania State College, read W. R. Crane's paper on the Bering River coal field. As it is the intention of COAL AGE to publish Mr. Crane's observations at length in forthcoming issues, his article will not be published in these columns. Dr. Crane's remarks did not refer to the political issues connected with the Alaska coal situation.

After adjournment to another room, Thos. W. Dawson, assistant chief engineer of the H. C. Frick Coke Co., read his paper on "Welfare," which was illustrated with stereopticon views of the various methods adopted by his corporation to preserve the lives, guard the health and increase the comfort and efficiency of its employees.

The banquet was held at the Fort Pitt Hotel, and was well attended and well served. Unfortunately, the acoustic properties of the banquet hall made speech-making difficult and some of the most carefully prepared addresses failed to accomplish their purpose.

THE KATALLA COAL PARTY

Jas. F. Callbreath, secretary of the American Mining Congress, spoke on the Alaskan question, stating that the progress of that territory was being delayed by Congress, while the American people decided on adopting a new leasing system in place of the former plan. It is to be admitted that the action of Congress toward the territory is aggravating in the extreme.

Certainly some action should be taken and perhaps it is unfair to impose regulations on Alaska different from those in force elsewhere. In fact a territory should not be treated as a wayward

child. But while the Katalla Coal party may have as complete justification as the Boston Tea party, yet the issue must not be clouded. Fraudulent entries are evils which must not be permitted. However, it must be conceded that the issue should be promptly decided by the Land Office.

SHALL MINE INSPECTORS BE ELECTED OR SELECTED

Rufus J. Foster argued forcibly for the repeal of the laws requiring the election of anthracite mine inspectors. He said the bituminous mining men should favor this repeal, as the law would be extended to the other region if once made operative in the northeastern part of the state. He pointed out that it was intended not merely to keep the present objectionable law in force, but to throw the gates wide open by making all mine foremen eligible for the inspection service without further examination.

Thos. K. Adams spoke along somewhat similar lines. Jno. W. Boileau discussed his favorite subject, the gradual reduction in the supply of available coal, especially near Pittsburgh, Penn. W. H. Glasgow discussed "The Welfare of the Miner is the Welfare of the Industry"; J. B. Johnson, "Evolutionary Revolution in the Coal Trade," while Jesse K. Johnston, under "A little nonsense now and then is relished e'en by mining men," gave the only witty speech of the evening, which having the merit of audibility and timeliness, was received with vociferous applause.

PILLAR SPLITTING IN SECTIONS

The morning session opened with the discussion of W. L. Affelder on "Rib Drawing by Machinery." As a matter of fact, as he stated, it was rather a description of a method of reducing ribs to a minimum, the balance being drawn by pick or a shortwall machine. The members persisted in putting Mr. Affelder at fault by suggesting that he had declared the system of universal application regardless of roof conditions.

The author claimed that the method promised an increased recovery in short-wall-machine work should such machines be used. The method involved the use of 40-ft. rooms with 120-ft. centers. This left block pillars between the room cross-cuts measuring 80 ft. wide and 100 or less feet long. The block pillars were split in three small ribs by two 25-ft. rooms, each rib being 10 ft. wide.

The secondary rooms mentioned, were driven up without necks from the cross-cuts and arranged so that the ribs in one block were drawn back before the secondary rooms in the next block toward the mouth of the main room were completely driven up.

A. C. Fieldner, chemist in charge of

the coal laboratory at the Bureau of Mines, read an interesting paper on "Accuracy and Limitations of Coal Analysis." Mr. Fieldner is not engaged by the bureau as an experimenter, but as a coal analyst. However, despite the great amount of work on his hands, he has found time to make some interesting side excursions into the theory of analysis, and he sets a remarkable example to the chemists of coal corporations who too often remain satisfied to run their regulation tests and do nothing to advance the profession.

BUSINESS TRANSACTED

The University of Pittsburgh gave an elaborate luncheon at the Hotel Schenley to the members of the institute. At its close, the meeting reassembled at the University and elected the following officers:

W. E. Fohl, consulting engineer, Pittsburgh, Penn., president.

J. K. Johnston, general mine superintendent, Pittsburgh Plate Glass Co., Charleroi, Penn., first vice-president.

T. A. Furniss, state mine inspector, Punxsutawney, Penn., second vice-president.

J. A. Krebs, third vice-president.

C. L. Fay, Wilkes-Barre, Penn., secretary and treasurer.

The executive board is as follows:

S. A. Taylor, dean of School of Mining, University of Pittsburgh, Pittsburgh, Penn.

A. P. Cameron, superintendent Westmoreland Coal Co., Irwin, Penn.

F. W. Cunningham, State mine inspector, Charleroi, Penn.

H. J. Hinterleitner, Clearfield, Penn.

A vote was taken to guide the executive committee as to the location of the summer meeting, and Wilkes-Barre seemed to be viewed with much favor. It was suggested, however, that should the institute visit the anthracite region, it would do well to extend the trip over four days instead of two.

A resolution, introduced by S. A. Taylor, which condemned the election of mine inspectors, received unanimous approval.

G. R. Delamater then read his paper on "Improved Coal Washing Conditions," and E. B. Guenther an article on "Gas Producers from the Standpoint of Mining Men."

DOES PYRITE FORM CLINKER?

At the close of this paper a controversy arose on the question whether the iron in pyrites was available to form flux in a furnace or producer. E. C. Wilson, as in his paper, claimed that only half the sulphur and none of the iron could be oxidized. Others believed that these elements would be dissociated in the presence of oxygen and declared that under those conditions the silicates would form a double compound with ferrous oxide and lime. After a spirited debate on this matter the meeting adjourned.

Next Subject for Discussion

In answer to our inquiry with reference to what subject should be brought up next for discussion in *Coal Age*, our readers have suggested 22 separate problems, covering practically every phase of coal mining. The questions presented are all of great interest, and in our next issue, Jan. 4, we will devote a page to outlining the subject which seemed to be uppermost in the minds of our readers. Everyone will be asked to contribute his views, and the new discussion will be limited to one month, so that other questions may be taken up in regular order.

We may say now that Geo. M. Brown, mining engineer, of the Great Western Coal & Coke Co., McAlester, Oklahoma, was first to suggest the subject which has been chosen by popular vote, and, therefore, is winner of the prize offered. The name of the subscriber who was successful in first mentioning the subject which ranks second in popular choice will be printed in a later issue.

Two Modern Coal Plants

The coal tipple of the Alberta Railway & Navigation Co. (now a part of the Canadian Pacific Railway Co.), at Lethbridge, Alberta, Canada, shown on the front cover of last week's issue, was designed and built by the Link Belt Co., of Chicago, in 1909, and is considered to be the most complete tipple equipment in the Canadian Northwest.

It was constructed to meet the many special conditions peculiar to the district. Among these might be mentioned a great amount of rock and the use of small mine cars.

Owing to the domestic character of the market, the breakage of the coal had to be kept down to a minimum, as there was practically no sale whatever for slack. Picking tables were therefore provided with ample surface for properly cleaning the lump, and special provision was made for loading the picked coal, for the removal of "fines" and for the avoidance of further breakage.

The equipment includes bar screens, shaking screens, crossover dumps, metal apron picking belts, gravity-operated weigh boxes and a self-tilting box-car loader. This machinery is all strong and simple.

The substantial A-type headframe, on account of its rigidity, spread of base, and the fact that stresses therein may be

accurately determined, is far superior to many present-day headframes built at more recent plants.

The many unique features of this Canadian installation will be more fully described in an early issue of *COAL AGE*.

OUR COVER THIS WEEK

The photograph shown on our front cover this week is also a view of a Link-Belt plant, which was constructed for the New River and Pocahontas Coal Co., Berwind, W. Va. The washery is built of concrete and steel, and has a capacity of 1000 tons of washed coal per day. A full description of this plant will also appear in *COAL AGE*.

West Virginia Examinations

In the Assembly Hall of the Waldo Hotel, at Clarksburg, an important examination for mine foremen and firebosses was conducted, Dec. 17-18, 1912, under the direction of John Laing, chief of the Department of Mines, assisted by the five following district mine inspectors: Karl F. Schoew, district No. 1; Frank E. Parsons, district No. 2; L. D. Vaughn, district No. 3; Earl A. Henry, district No. 5; James Martin, district No. 7. Chief Laing and the district inspectors appreciated the interest shown in the examination by the local coal operators and applicants alike.

In order to make the examination thoroughly practical and to test the ability and fitness of applicants striving for certificates of competency to fill positions as mine foremen and firebosses, and in order that the greatest degree of safety and economy in coal mining may result, every reasonable assistance was given by the board of examiners to candidates in the way of explaining questions that were not clear to those being examined.

A first-class mine-foreman's certificate requires that the applicant must have had five years' experience in mines, of which three years must have been spent in gaseous mines. He must also pass the examination required of mine foremen. For assistant mine foremen the applicant must have had five years' experience in mines not necessarily gaseous. For a fireboss' certificate, the applicant must have had three years' experience in gaseous mines and pass the fireboss' examination.

Thorough tests were given the candidates in detecting gases with safety lamps; the use of the water gage and the anemometer. The examination questions were all of a practical nature and the tests conducted, impartial. The applicants each received a number, upon arriving, and were only known by that number, to the examiners.

The grading of the examination papers will be done at the offices of the Department of Mines, and the result will be made known on or before Jan. 15, 1913.

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Of this issue of Coal Age, we will print 11,000 copies. No copies will be sent free regularly. There will be no back numbers. The figures shown here each week represent live, net circulation.

This journal is interested solely in matters relating to the fuel industries, and is designed to be a medium for the free interchange of ideas, the detailed description of coal-mining practice, and the expression of independent thought calculated to benefit both operator and miner.

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COAL AGE

Some Comments on the Anthracite Decision

The Supreme Court decision in the anthracite-trust case may be regarded as opening up a still wider field for the application of the Sherman Anti-Trust Law. In the case of the Northern Securities Co., the Court decreed that the mere power to restrain trade was sufficient cause for action on the part of the government, regardless of whether such power be actually exercised or not. And again in its statement of that basic principle "by rule of reason" in the oil and tobacco cases, the Court clearly showed that any guilty combination need expect no mercy even though it be within the strict letter of the law.

In this new decision the Supreme Court reverses the one below on the 35-65 per cent. contracts. It does this on the grounds that, while each of these contracts, considered singly, is wholly innocent, they are, collectively, an illegal restraint on interstate commerce; even acts entirely lawful may at times be steps in a criminal plot. This is regarded as the most important point brought out in the new decision, and Attorney General Wickersham appears to have tersely summed it up in his statement that "while a single contract is innocent, a bundle of them may be guilty."

The anthracite companies do not appear to regard this point with alarm, although the government takes the position that this will ultimately effect a disintegration of the working agreement under which hard coal has been marketed for so long. As is well known, the amount handled under these contracts is only between 20 and 25 per cent. of the total production, and the question therefore hinges on what effect this loose tonnage will have in the markets.

Under normal trade conditions, the independent operator will no doubt find it to his advantage to work in harmony with the larger interests. It is highly improbable that any change, under these conditions, will occur. But when the markets are abnormal, as coal markets

will be, the situation will be different. Thus in times of short supply and heavy demand, we may expect to see the consumer squeezed to the last dollar, while on the other hand a dull market will no doubt be subject to raids on the part of the independents.

In the second important point in its decision, the dissolution of the Temple Iron Co., the Supreme Court bears out the findings of the lower court. But it is doubtful if even the government regards this victory as of any real tangible value, although at its inception it was of vital import and may be described as a nucleus about which the present conditions in the industry were built.

The Temple Iron Co. enjoys the unique distinction of having only railroad presidents on its board of directors. It was founded primarily for the purpose of crushing a movement for the construction of a competing road into the hard-coal field, and its stock is held jointly by the principal anthracite roads in proportion to their importance. Conditions now are such that the construction of any such line is highly improbable if not impossible, so the company has served its purpose and may be regarded as a mere shell. Its most important function at the present time probably lies in its use as a "round table" for the meeting and discussion of policies by the anthracite officials.

The Use of Adobe Dust

The remarks of Samuel Dean, in our issue of Nov. 30, put much stress on the failure of moisture to prevent the extension of an explosion. Despite the fact that his article was intended to emphasize the value of adobe dust, he is fair enough in his judgment to give moisture due credit as a probable factor in reducing the force and extension of the explosion, declaring, however, that the final extinguishment was the outcome of expansion.

We are not disposed to under-rate this influence or to belittle the value of stone dust, and have frequently urged that the

advantages of both be kept in mind. That the explosion at Hastings extended as it did is probably because there was no opportunity for adequate expansion except perhaps at the start when an excess of gas made extinguishment difficult.

Between the third and second south entries was a sidetrack for which the heading was widened, and an open diagonal airway near the latter entry led at an angle of about 45 deg. to the right, affording the blast an opportunity to bifurcate at that point. In this part of its course, some degree of expansion was possible, but the presence of gas made its action less obvious.

However, after reaching the second south entry, all openings were passed perpendicularly or at such large angles that the explosion would have had almost to reverse its direction to avail itself of the opportunity presented. It seems that all the openings at right angles to the slope were closed with concrete stoppings. Though these were blown out, they must have opposed no little resistance to the sideward extension of the blast.

It was not until the explosion burst from the end of the tunnel that it could expand and expire, and here the evidences of its existence cease. The influence of expansion in aiding and controlling ignition was therefore evidenced in a marked degree.

But in tracing the explosion up the main slope alone, we overlook the significance of another important fact which emphasizes the value of moisture. The coal-dust ignition did not go far toward the intake, which some regard as the preferential sense of a coal-dust explosion. The word "ignition" is used in a severely restrictive sense because the products of the explosion and its violence certainly traveled against the intake air.

The men in the third south entry were hurled against the rib with great violence and the pumpman in the back slope was slightly burned. These men were in air which was approaching the originating point of the explosion at the time of its occurrence.

But the ignition did not travel far in those directions, and we seem justified in believing that water and the defect of gas in this case extinguished the flame. Down the intake airway, water was continuously flowing and consequently the

disaster at Hastings furnishes evidence that while the importance of moisture may be unduly emphasized, it has a value not to be overlooked or despised. In any event it is not safe to draw conclusions on dust ignition from explosions where gas is the known cause.

Nonparallelism of Measures

The lecture of N. H. Darton, on the folds in the anthracite region, draws attention to a well known fact that the beds in badly folded measures do not lie in perfect parallelism. This truth has been somewhat hidden to the uninitiated by the fact that many of the early plotted cross-sections of the lower coal measures were based on the few beds then being worked, and as surmise was best expressed by parallelism, the measures were shown by the geologists of the state surveys as if the intervals between them were equal throughout.

Yet it could be seen that the radii of curvature were such that a break in regularity must necessarily occur somewhere, and that this point, geologically speaking, could not be far from the surface.

It appears that the measures, originally flat, when pushed along on the surface of unaffected formations did not travel along equally. Some of the softer beds were not stiff enough to form the large arched domes from syncline to syncline and made reverse bends which, on further pressure, tended to fold still more. These bends ultimately became overthrows of a marked character.

Thus it was that the openings in the arched strata were filled. Had it been otherwise, there would be immense cavities between the stressed upper measures and the unstressed basal strata and these are perhaps never found.

Even in the more gently flexed beds of the bituminous region, the thickness of the intervals between coal beds may have been measurably increased by pressure, and this fact may explain, for instance, the marked irregularity of some of the unworkable beds in the Georges Creek region. Action of this kind must have been trifling and perhaps the cavities thus formed were filled in many cases by infiltration rather than by folding.

We must expect considerable thickenings under the Laurel Hill and Chestnut Ridge anticlinals in West Virginia and Pennsylvania. When the upper stressed measures were pushed violently along the

surface of the less affected beds below, the detrition must have been violent and the removal of material extensive.

The under bodies of the synclinals and the surfaces over which they moved must have been scarified for furlongs, and material thus scraped must have served to fill in the anticlinal vacuities. If, however, the horizontal shear permitted one bed to outstrip another, a similar drag-scraping action on a smaller scale would result.

The bed which traveled would always scrape on the one which lagged, and as the stiffer beds transmitted the push more rapidly than the more plastic, they tended to work these plastic measures into a crumpled mass as they moved forward.

Filling by alluvial waters and by mineral solutions helped out the work. Folding, extrusion and expansion of the beds at right angles to the direction of pressure must have completed the action. The subject is a large one and the remarks of Mr. Darton may cause a revival of a matter for discussion which has slumbered all too long.

A Clearing House

Our four largest coal-mining institutes have just recently met and the occasion seems fit to call attention to their value as clearing-house centers for ideas. All superintendents have problems not easy to solve which could be clarified by meeting others who have puzzled over the same difficulties.

At such assemblages, the papers presented do not cover the whole interest of the meeting. The little chats in the university and hotel lobbies and the conversations at the dinner table between workers in the same field cast a new light on old problems. Thus the institute is a clearing house for brains to which all, who are banking such cerebral matter, should belong.

At some institutes, this idea is clearly brought out. At others many active, original men refrain from attending, and the attitude of the corporations is not as friendly as it should be.

Institutes will ever be what the coal companies make them. Where they are encouraged, they become valuable and inspiring. Where the companies hold aloof and do not advocate the attendance of the whole of the managing staff, the proceedings of the institutes tend to fall to a lower level of interest.

Colliery Notes and Comments

Practical hints gathered here and there, and condensed to suit the busy reader

Electric mine motors should be equipped with powerful headlights as they enable the motormen to see obstructions on the track and thus eliminate many wrecks.

The peeling of timber at the mines is unsatisfactory and expensive because of the limited amount of yard room and the accumulations of bark. Peeling in the woods reduces freight charges, saves yard room at the mines and prevents decay and insect attack, because it is done soon after cutting.

At places on electric haulages where sparking is possible, calcium chloride sprinkled along the roadbed and beside the road for the purpose of producing a constant moist condition, together with a short fireproof section of roadbed would render the spread of a flame due to sparking almost, if not quite impossible.

Compressed air for haulage purposes is absolutely safe, hence in every gaseous mine it is superior to any other method of haulage, in spite of the waste and large cost of operation. In one mine in the anthracite region all the haulage is done by compressed air aided by one mule which works near the shaft bottom.

In northern France and Belgium very gaseous coal seams, less than 3 ft. thick, and having a pitch of 60 deg., are worked at great depth. The temperature of these mines varies from 85 to 113 deg. F. The air is constantly filled with dust, much like a fine black snowstorm; this dust decomposes rapidly, producing a most disagreeable odor.

Where mine power plants are located near or over the mine itself an easy and economical method of disposing of the ash is to arrange a tunnel under the fire boxes, with a slope of not less than $\frac{3}{8}$ in. to the foot. Connect this with a bore-hole and wash the ashes down the latter, with mine water, where they may be used for flushing abandoned workings if desired.

Stoppings between main and return airway courses should be substantial in character. The material used and the workmanship should be of the best. Sand stoppings often prove sufficient, but it is usually more economical to use mortar or concrete. Board stoppings are apt to be expensive as they are frequently destroyed by heavy blasting unless reinforced by dirt.

When about to electrify a mine let the working conditions, height of coal,

size of haulageways, and the method of mining govern the voltage to be installed. If the mine is gaseous do not leave the installation entirely to the electrician as he is not apt to be fully informed as to the quantity and distribution of the gases. A 300-volt potential is safe and sufficient under most conditions.

The primitive miner worked under many difficulties. Mechanical ventilation was entirely unknown or in a very crude state. The only light they had was tallow dips for nongaseous mines and fish eyes or rotted fish skins, which were more or less phosphorescent, for gaseous mines. The only powder was that made from dampened limes; hence most of the work was done with the pick.

The Philadelphia & Reading Coal & Iron Co. has established a system of baths for the mules used in their underground workings which they claim has been of great assistance in preserving the health of the animals. The baths consist of concrete basins 6x37½ ft., sunk 4 ft. in the stable yard. The bottom and inclines at each end are corrugated. A steam jet heats the water in winter and a shower 6 ft. above the center of the tank adds much to the speed with which the animals are cleansed.

The use of fireproof paint for painting coal breakers tends to reduce danger from fires. The outside of such structures is usually painted black and the inside white. This paint is what is called "cold-water paint." It comes in the form of a powder and is mixed with cold water in a paint-mixing machine furnished by the paint manufacturers, and is applied by a spray worked by compressed air. Four men can paint the inside and outside of an ordinary breaker in four weeks' time.

While there is no standard as to what constitutes a dusty road or place, and little reliable information as to the amount of dust necessary to produce an explosion, it appears from a recently published report on preliminary experiments at the French official experimental station at the Levin mines, that the amount of coal dust necessary to propagate an explosion is to be measured in small fractions of an ounce per cu.ft. of air space. With some of the dust tests, less than one-third of an ounce of dust per cubic foot was sufficient to propagate an inflammation through and

several feet out of the end of an experimental tube 25 ft. long.

The Committee on Coal Analysis of the American Chemical Society reports that the best method of determining moisture in coal is to dry one grain of the coal in an open porcelain or platinum crucible at 104 to 107 deg. F. for one hour in a double-walled bath, containing pure toluene, cool in a desiccator and weigh covered. With coals high in moisture and in all cases where accuracy is desired determinations must be made both with coarsely ground coal and with powdered coal. When more moisture is found in the coarsely ground than in the powdered coal, a correction must be applied to all determinations made with the latter.

J. E. Barton, Kentucky's new State Forester, is coöperating with coal operators with regard to preparations for growing forests on the surface of lands now being mined. Mr. Barton recently stated that as an average proposition, 3½ ft. of timber is needed to produce a ton of coal. Mr. Barton referred to the St. Bernard Mining Co. of Earlington, Ky., as one of the pioneers in the field. John B. Atkinson, president of the St. Bernard Mining Co., until his death a year ago, began the work of planting trees on coal lands about 20 years ago, and the results are now easily seen. The timber will shortly be available if needed. Mr. Barton reported the receipt of many inquiries from coal operators in regard to securing surface rights for forestry purposes.

A good friction grip for use on an endless-haulage system should be easily attached and detached. It should work equally well on uphill and downhill roads and should possess few wearing parts. It should have a powerful grip on the rope without in any way damaging it and should work easily around curves. Instead of a grip some authorities consider the best method of attaching cars to the rope to be no grip at all apart from the chain itself. This should be wrapped two or three times around the rope near the end of the chain; then the body of the chain should be placed inside the hook and the whole made tight. This method reduces wear on the rope to a minimum as the injury due to bumping or stretching of the hitchings at the point of attachment of the friction grip is entirely absent.

Pottsville Convention - United Mine Workers of America

The reconvened convention of the United Mine Workers of America, District No. 9, opened in Pottsville, Tuesday, Dec. 10, and continued in session until Saturday, Dec. 21, making a total of 23 days, they having been in session an equal number of days in the previous convention, a full report of which was published in *COAL AGE*, Nov. 9. The total cost of both sessions has been conservatively estimated at \$40,000, a rather costly convention in view of the fact that the most important business on hand was the election of district officers.

The convention was hardly called to order before there were abundant signs of trouble, several hours being spent by the delegates in debating the proper method of dealing with substitute delegates that had been sent by their locals in place of others who were present at the first session. President Fahy called Vice-President Strambo to the chair, so he could take part in the discussions that were raised by the delegates on every point of issue.

THE ATTACK ON DOUGHERTY

James Maurer, of Reading, State President of the Pennsylvania Federation of Labor, made known his readiness to support his charge against Miles Dougherty, of Shamokin, wherein he alleged that Dougherty received an annual Christmas present from Andrew Carnegie of \$1000, and furthermore he charged Dougherty with lobbying for the the State Police Bill in the last session of the Pennsylvania Legislature. Various motions were offered and several hours spent in discussion, before it was finally decided to refer the matter to a committee of five, each disputant to name two and the four to pick a fifth member.

Dougherty arose at this point and stated that he would let his opponents pick three men, and would be satisfied with one himself. Later a motion was passed accepting the report of the committee which exonerated Dougherty of being the recipient of the so called annual Christmas present from Andrew Carnegie.

President Fahy read the following report of the agreement between the American Federation of Labor and the United Mine Workers of America at the recent Rochester Convention:

All carpenters in a shaft or mine, either making repairs or setting new work, shall be members of the United Mine Workers of America; all carpenters engaged in outside work, either in car repairs or breaker repairs, shall be members of the United Mine Workers of America; all men engaged in rebuilding or constructing breakers shall be members of the U. S. & C. & J. of A. A transfer card in the carpenters union will be taken in place of the initiation fee in

the mine workers' organization. And while the officials are completing the ratification of this agreement, all temporary agreements will be permitted to stand.

Practically all day Friday was taken up in accrimonious discussion between Martin Nash, member of the International Board, who defended himself against charges brought against him by Delegate Grace, wherein it was alleged that he attempted to use his position in the Mine Workers to secure his brother a political berth. Nash denied the essence of the charge and matters quieted down.

THE ELECTION

It was announced by the tellers that the total vote cast was 12,910. Fahy, 4319; James Matthews, 8165; John Dandow, 213; John Strambo, for Vice-President, and Richards, for Secretary-Treasurer, were also reelected.

The announcement of the tellers was met by a statement that fraud had been perpetrated in several of the locals, during the casting of the ballots. After several days' heated discussion, a motion was passed as follows:

That inasmuch as charges of fraud had been brought against the Shenandoah Local and the protesters had failed to substantiate their charge, that the vote of the tellers be accepted, and the officers receiving the majority vote be declared elected.

Immediately after the passage of the above motion, several delegates announced that they would appeal the election to the International Board. In justice to Mr. Matthews, it must be said that at no time was the charge brought against him of being directly or indirectly, implicated in the alleged fraudulent balloting, and his friends assert that if all the alleged fraudulent ballots will be thrown out by any investigating committee that may be appointed, he will still have a substantial majority over his opponent.

The Constitution Committee reported two proposed amendments. One providing for the filing of reports to the district officers on the opening day of the convention. The second amendment, providing for the election of officers every two years was defeated.

The advocates of industrial democracy will have a long way to travel before they can convince the American public that the work of producing coal will result in cheaper fuel if the methods of the miners as exemplified in the Pottsville Convention can be taken as criterion of their ability to handle this great industry. The only business transacted was the election of district officers, and this will be followed in turn by a further expenditure of the miners' money for the financing of the work of the International Investigating Committee. Surely

they cannot lay claim to be efficient managers of their own business.

THE NEW PRESIDENT

James Matthews, the new president, is a native and resident of Shenandoah. At the age of eight he began as a slate picker and a few years later he was engaged in outside work at the breaker; he continued at this until 16 years of age, when he secured employment in the mines as a door tender, later as a mule driver, and laborer, and finally becoming a miner at the age of 17, being at that time one of the youngest miners in the field. He is still working at this occupation and will continue to do so until he assumes his new duties, Apr. 1, 1913. His election is a strong personal tribute, as in President John Fahy he had a foe-man worthy of any man's steel.

Mr. Matthews is a member of Local No. 1509, being its president. He is also president of the General Grievance Committee and since the new scale has been adopted, he has handled many grievances satisfactorily to his constituents. He was one of the first men to enroll in the United Mine Workers of America, and has attended all the District, Tri-District, and National Conventions, as a delegate. Hitherto, he has not held any paid office in the organization. He was one of the delegates at the last convention, at Wilkes-Barre, and was one of the strongest supporters of President White in his efforts to have the miners accept the present agreement.

Though not boasting of any oratorical ability, it must be conceded that when he had occasion to speak at the recent convention, he commanded the close attention of every delegate present, and though he had more at stake than others, he at all times refrained from making any unkind or ill-advised remarks. The one point that he insisted upon, above all others, was that fair play be given to all and at no time should the convention do anything that would be against the best interests of the organization. He frankly stated that it was not his wish to be the recipient of a tainted election.

One Cause of Accidents

One of the British mine inspectors recorded an explosion that occurred in a place which he was assured had been examined a quarter of an hour before the accident. Stringent inquiries were made, and it was discovered that the miner took a safety lamp down, but as soon as he reached the face of the heading he struck a match to light a candle, and immediately the firedamp was ignited. Further inquiries disclosed the fact that the management had so feeble a grip on the discipline that orders were openly defied. In cases of this sort the management is perhaps more to blame than the miner.

Discussion by Readers

Comment, Criticism and Debate upon Previous Articles, and Letters from Practical Men

Effect of Moisture in Mine Explosions

Referring to the discussion of the possible effect of moisture on the explosibility of coal dust, COAL AGE, Nov. 30, p. 766, I think both Messrs. Verner and Dean minimized too largely the deterrent effects of moisture in a mine explosion. The comments of the editor, on the same page, appeal to me as the only sound conclusion. While, as stated in the editorial comment, moisture may not be considered as a sure preventative of the extension of an explosion once fully started, it must be conceded that its presence in any considerable amount may, to that degree, check the propagation of the flame.

It will be readily conceded that any moisture present is converted at once into steam by the heat of the burning gas. While the expansion of the steam thus produced may add to the force of the blast, it must be remembered that there is a considerable absorption of heat, which became latent in the steam, and this absorption of heat must reduce the temperature of the flame, in some cases, below the point of combustion and cause extinction of the flame.

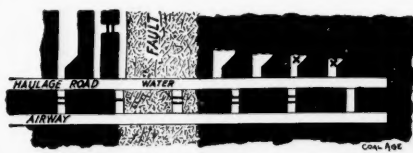
The moisture is most effective, however, when the dust is so wet as to prevent its being thrown into suspension in the air. Thus moisture acts in two ways to arrest an explosion: 1. By reducing the temperature, owing to the absorption of heat by the steam. 2. By reducing the quantity of dust thrown into the air. Likewise, fine stone dust or other incombustible dust acts in two ways to arrest an explosion: 1. By diluting the atmosphere of coal dust by its presence. 2. By absorption of heat.

The conditions, known to every practical mining man, are often such as cannot be wholly eliminated. Some mines are naturally dry, while others are wet; some coals are soft, friable, gassy, and make much fine dust; while others are hard and their mining does not produce much gas or dust. In some mines, it is practically impossible to prevent frequent roof falls from blocking airways, destroying doors, stoppings and brattices, and otherwise interfering with the ventilation of the mine.

Here the human factor comes into play. In gaseous mines, constant vigilance and faithful service alone can prevent dangerous accumulations of gas; and when these occur, caution and experience are required to avoid accidents. I believe it is more important to con-

sider means of preventing mine explosions under the conditions existing in particular mines than to study the influences that tend to arrest an explosion once started. The most careful attention should be given to reduce explosive conditions in mines by removing dust, wetting the roads and working face before firing, and by the suitable application of stone dust on roadways where this is deemed expedient.

I agree, however, fully with the statement, p. 766, that expansion is a most important factor in arresting the progress of an explosion. This theory is supported by the experience I gained in the investigation of an explosion in a thoroughly moist section of a mine, some time since. The headings where the explosion occurred (see accompanying figure) had passed through a rock fault for



PLAN OF HEADINGS DRIVEN THROUGH FAULT SHOWING ROOMS WHERE EXPLOSION STARTED

about 65 ft., 100 yd. back from the face of the heading. The fault was what is commonly known as a "squeeze out." At this point there was a constant pool of water accumulating from the fault. Except where the coal was freshly broken at the working face, and at the loading places in the rooms, and at the switches where considerable coal had fallen off the cars, the place was thoroughly wet. Water dropped continually from the roof and sides of the heading and wet the waste or gob, which contained much fine coal.

The explosion occurred in the two inside rooms, marked x x. These rooms had just been widened out. The blast traveled with great force out through the narrow wet "squeeze out," where the entry passed through the solid rock of the fault. After the explosion, all the exposed surfaces inside of the fault were very dry, the water having been evaporated by the great heat. The timbers and the ribs of the entry were covered with particles of charred coal; and, at the point of ignition and for 75 ft. back from this point, the ribs were charred. A fine reddish ash covered the floor and all projecting places, this being most pronounced near the point of ignition.

The indications showed a decreasing amount of heat from the point where the explosion started to the narrow passage through the rock fault. The blast had evidently traveled through this narrow passage with great violence. Just outside of the fault another heading had been driven and there was considerable open territory, giving room for expansion. Here, the blast had evidently split and the flame died out altogether. From this point, outby, the blast continued with decreasing force down the straight entry to a turn, where it was again split and dissipated in the open workings in this part of the mine.

I concluded, from this investigation, that, although the explosion was initiated by gas, it developed its great force by the action of the flame on the fine coal and dust, from which it distilled the gas that propagated the explosion. The moisture present did not prevent this distillation of gas. It was evident, however, that the flame was much cooled in passing through the wet rock entry, at the fault, and finally extinguished by the further cooling due to the expansion in the workings just outside of this point. I believe, from my observation, that had there been quantities of dry dust at this point, its combustion would have generated the heat necessary for the distillation of the gas and propagated the explosion throughout the mine.

I believe a straight confined entry is more favorable to the propagation of an explosion than a crooked open one. I believe, also, there is more danger of a serious explosion resulting where a mine is divided into separate sections by solid barriers of coal, as in the panel system of working. This may be opposed to the generally accepted theory that in the panel system, a local explosion in one section is not apt to be transmitted beyond that section. My experience teaches me, however, that an explosion confined in narrow workings may develop greater force than where it can expand in the extensive underground workings of a modern coal mine.

Beyond question a wet zone has considerable effect in retarding an explosion, and its propagation beyond such a zone will depend on the condition of the entries and workings with respect to gas, dust and moisture. I do not believe in the efficacy of wet zones with stretches of dry territory between them.

WILLIAM KELLUM, Supt.,
Southern Coal & Coke Co.
Glen Carbon, Ala.

Improving Living Conditions Among Miners

The writer wishes to express his appreciation of the letter in *COAL AGE*, Nov. 23, p. 733, written by a "West Virginia Engineer." In any opinion this letter expresses a modern common-sense view in regard to the matters whereof he writes.

The use of bathtubs as coal bins by tenants has gotten to be a standard argument with those who do not favor providing anything for their men in the way of better living conditions. This, indeed, may have occurred, in some instances. It is, however, a poor argument for declining to give people water any nearer than the nearest spring. Personally, I do not favor the "model town" and would not want to live in one, believing that sufficient time and energy can be spent in fixing up a town, to detract materially from the energy devoted to the mining of coal, which should always have first consideration.

I have seen people, in a mining town, who apparently believed that window stops were suitable for firewood and seemed to consider it a disgrace to keep their premises clean, especially around the back door. I have seen twenty-penny nails driven through plaster to serve as a clothing hook. I have seen hundreds of people who claimed that a certain load of coal was not delivered, or that the coal was all slack, and have heard them affirm steadfastly that they never broke the window or lock with which they were charged. I have known an operator to furnish his men with a steam-heated bath house, provided with shower baths and hot and cold water, at a moderate charge, only to have his men refuse to go to work one morning because a pipe had burst and no water was available for bathing the night before.

Without professing any altruism in the matter, I believe that, despite the aforementioned facts and other like instances of ingratitude, it is only common decency for operators to make living conditions better than they are at present. It is not necessary to lay out a large amount of money in concrete sidewalks and garden spots; but, at the least, the town should be kept clean. The enforcement of strict rules in regard to the care of houses is easy, once it is firmly established. What would any city or village become were there no regulations for the common health? Would any child learn to wash its face or comb its hair were it not for the strong parental discipline? Shall we, therefore, deceive ourselves with the argument that the tenants are fit for nothing better, or shall we look the situation squarely in the face and realize that not only are improvements better for the workers, but in addition make for better satisfied men and better conditions?

It is not necessary to build brick houses nor to provide bathtubs. It would be sufficient for a start to make everyone keep his premises in good shape, apply a coat or two of paint to the houses and build tidy little fences around the houses. This would be better both for the workers and their employers.

ANOTHER WEST VIRGINIA ENGINEER.
Charleston, W. Va.

Automatic Mine Doors Electrically Operated

In answer to Charles A. Mitke, Bisbee, Ariz., *COAL AGE*, Dec. 7, p. 808, will say, about ten years ago, at St. Charles, Mich., I installed some 10 electric trappers, operated by approximately 1-hp. motors. They worked successfully. The motors were series-wound and so set that the doors opened toward them in each case. Either double or single doors can be used.

The motors were connected to two switches, located one on each side of the door. These switches are easily and simply made of wood. The distance of the switches from the door will depend on conditions and speed of trips. If there is a down-grade toward the door, the switch should be placed farther away.

When the doors were closed, red-light danger signals, placed on each side of the door, were cut into the circuit. When the door was open the red lights were cut out and white lights cut in. The lights were placed in such a position as to be plainly seen when approaching the door from either direction. These signal lights were operated automatically by the movement of the door. The switches operating the doors, in each case, were connected to the motor by three wires, and placed close enough to the track that the driver, in passing, could easily reach the lever. After passing through the door, he pushes the other lever and the door is closed. When returning the driver pushes the levers in the opposite direction. The motors were geared down and each operated a small wooden drum, on which the pulling chain was wound in such a way that there was no sudden jerk, but a slow and positive pull.

The objection to using such automatic arrangements, as was stated in *COAL AGE*, are that a slight fall of roof slate would prevent the door opening; and coal, at times, fell off the cars in such a way as to prevent them shutting. This, however, rarely occurred, though occasionally dampness caused some trouble. The total initial cost of material and installation did not exceed \$40 per door; and the cost of upkeep was trifling. I will gladly furnish any further information if desired.

J. T. PHILLIPS,
Supt., Bliss Coal Co.
Swan Creek, Mich.

Certification of Assistant Mine Officials

The state mining law of Illinois, Sec. 3, makes it unlawful for the operator of any mine to employ other than (d) a certificated mine manager, (e) a certificated mine examiner, and (f) a certificated hoisting engineer. The same law, however, Sec. 20, (b) 3, gives the mine manager or superintendent the right to appoint as assistant mine manager a "competent person," who shall exercise his functions as the mine manager may instruct or direct.

In my opinion, the mining law should require a certificate of competency for all assistants as well as for the regular mine officials just mentioned. It does not seem right that a noncertified man, acting as assistant, should have the right to dictate and direct the work of a certified mine examiner when the latter has proved his competency by passing the required examination. The assistant so appointed has the same opportunities to educate himself and should be required to do so before he can act in the capacity of a certified mine official.

DAVID FULTON.

Marion, Ill.

[Our correspondent apparently fails to appreciate the situation that may arise at any moment, in a mine, and may call for the assistance of any competent man to carry out the specific instructions of his superior who is a certified mine official.

Such an assistant is not free to dictate or to assume any authority other than that conferred upon him by his superior. The law, in making this provision, does not assume that the assistant has any ability to act on his own recognizance, but simply to carry out the instructions given to him by a certified mine official, in an emergency.

The service of the assistant is only temporary and in the nature of that of a messenger or an officer delegated to perform a certain duty, after which and beyond which his authority ceases. Any certified official receiving instructions through such uncertified assistant is responsible to his superior only, whose instructions the assistant conveys. The assistant would overreach his authority if he assumed to dictate or to do other than carry out the instructions of the mine foreman who sent him.

All competent mining laws provide against such emergencies. It is worthy of note that the Illinois mining law places an ultimate time limit on the employment, as assistant, of any uncertified person, either as mine manager or mine examiner. The law makes such appointments temporary, "for a period not exceeding seven days, and with the approval of the state inspector of the district, for a further period not exceeding twenty-three days."—EDITOR.]

Examination Questions

Selected from State Examinations, or Suggested by Correspondents

Mine Managers' Examination, Springfield, Ill., Nov. 11, 1912

(Selected Questions)

Ques.—We have a tank full of water, in the morning, when commencing work, and there is no more water in sight as the well is dry. The tank is circular, 12 ft. in diameter at the top, 14 ft. at the bottom, and 18 ft. deep. How long will this water enable us to run, using 1200 hp. per hour?

Ans.—The adopted standard horsepower is the evaporation of 30 lb. of water per hour, using feedwater at a temperature of 100 deg. F., and operating under a gage pressure of 70 lb. On this basis, for the given horsepower, the weight of water evaporated would be $1200 \times 30 = 36,000$ lb. per hr., or 600 lb. per min.

The volume of the tank is

$$0.7854 \frac{h D^3 - d^3}{3 D - d} = 0.7854 \times \frac{18}{3} \times \frac{14^3 - 12^3}{14 - 12}$$

$$= 0.7854 \times 6 \times \frac{1016}{2} = \text{say } 2394 \text{ cu. ft.}$$

The weight of the water in the tank when full is $2394 \times 62.5 = 149,625$ lb. The length of time this water would last, using 600 lb. per min., is

$$\frac{149,625}{600} = 249 + \text{min.}, \text{ or } 4 \text{ hr. } 9 \text{ min.}$$

Ques.—What size of pipe should be used in transmitting 1000 cu.ft. of air per minute a distance of 4000 ft., at sea level, when the initial gage pressure is 60 lb.?

Ans.—Calling the quantity of free air compressed, $Q = 1000$ cu.ft. per min.; the weight of this air, $w = 0.0766$ lb. per cu.ft.; the distance of transmission, $l = 4000$ ft.; the gage pressure, $p = 60$ lb. per sq.in.; the number of compressions, $n = \text{absolute pressure divided by gage pressure}$; the constant depending on size of pipe, $c = 45$ to 60 , say, in this case, $c = 50$; the number of compressions, in this case, taking the atmospheric pressure, at sea level, as 15 lb. per sq.in., is found as follows:

$$\frac{60 + 15}{15} = 5 \text{ compressions}$$

The required diameter of pipe for this transmission is

$$d = \sqrt[5]{\frac{w l Q^2}{c n p}} = \sqrt[5]{\frac{0.0766 \times 4000 \times 1000^2}{50 \times 5 \times 60}}$$

$$= 12.3, \text{ or } 13 \text{ in.}$$

Ques.—Suppose that a sump 12 ft. in diameter and 25 ft. deep, full of water, has an inflow amounting to 20 gal. per min.; how long will it take a pump having a 7-in. water-end, a 14-in. stroke and making 75 double strokes per min., to empty the sump, the efficiency of the pump being only 72 per cent.?

Ans.—The piston speed of this pump is

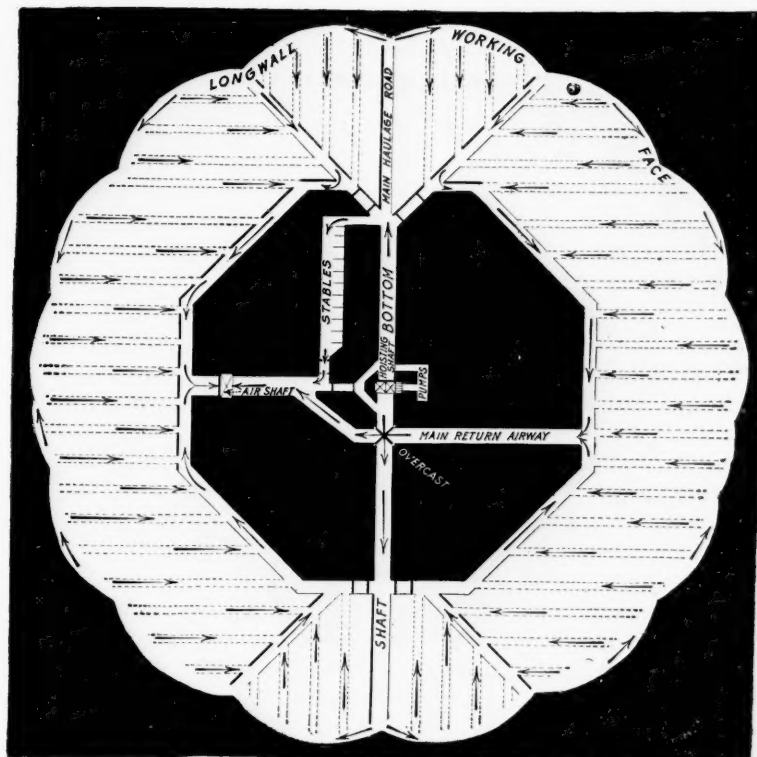
$$\frac{2 \times 75 \times 14}{12} = 175 \text{ ft. per min.}$$

The diameter of the water-end being 7 in., the discharge of the pump, at this speed, is

The efficiency of a good pump should be about 85 per cent. on the water end.

Ques.—Show, by sketch, how you would open up a longwall mine, ventilated for 150 miners, 25 daymen and 12 mules; show stables near bottom of shaft.

Ans.—The accompanying figure is a plan for a longwall mine, in which a shaft pillar is left for the protection of the shaft. The longwall face is started simultaneously all around the circumference of this shaft pillar. The hoisting shaft, downcast, is at the center of the pillar, and the air shaft, upcast, at one



PLAN OF LONGWALL WORKINGS VENTILATED BY FOUR SPLITS OF AIR

$$G = 0.72 \times \frac{0.7854 \times 7^2 \times 175 \times 12}{231}$$

$$= \text{say } 322 \text{ gal. per min.}$$

The inflow being 20 gal. per min., the net discharge from the sump is $322 - 20 = 302$ gal. per min.

The quantity of water in the sump when it is full is

$$\frac{0.7854 \times 12^2 \times 25 \times 1728}{231} = 21,150 \text{ gal.}$$

The time required for this pump to drain the sump is then

$$\frac{21,150}{302} = 70 + \text{min.}, \text{ or } 1 \text{ hr. } 10 \text{ min.}$$

side. The main haulage road is driven on the center line of the hoisting shaft. The diagonal roads and working places are shown by the dotted lines. Allowing 100 cu.ft. for each man and 600 cu.ft. for each mule, the volume of air required in this mine, is

$$100 (150 + 25) + 600 \times 12 = 24,700, \text{ say } 25,000 \text{ cu.ft. per min.}$$

The air is divided at the foot of the downcast into two currents, as shown by the arrows; and each of these is again divided so as to give four splits traveling around the working face. All principal points where the cross-roads enter the main roads are protected by double doors.

Sociological Department

For the Betterment of Living Conditions in Mining Communities

Continental Miners' Hospital

By W. L. Moss*

The Continental Miners' Hospital was organized in July, 1912. This action had been discussed by the employees of the company, with the medical staff, and with the general manager, some time previous to that date. Acting upon the suggestion of some of the leading miners of the Continental Coal Corporation, a petition was circulated among the employees, petitioning the company to establish a hospital, the signers agreeing to allow 25c. per month to be deducted from their wages for its maintenance.

MINERS PROVIDE MAINTENANCE COSTS

No less than 85 per cent. of the employees of the company signed the petition, and after it had been delivered to Erle Martin, the president of the company, and the expenditure of the funds necessary to establish the hospital had been approved by him, the work was taken up vigorously by the general mine office with headquarters in Pineville, Ky., and pushed to completion. The residence of A. C. Blowers, close to the Louisville & Nashville R.R. station, was leased and equipped by the company.

The hospital consists of two reception rooms, an office, nurses' bedroom, bathroom, kitchen and dining room, three large closets, and two large halls downstairs. Upstairs is the operating room, two private and three general wards, one of which is for colored patients, a bath room and hall. The hospital is equipped with 20 beds, and one of the reception rooms downstairs could be turned into wards if necessary, increasing the hospital capacity to 30 beds.

The buying of the necessary equipment was turned over to the medical staff of the company, and the superintendent of the hospital. It is strictly modern, consisting of up-to-date operating table, cabinets, sterilizers, prophylactic outfit, oxygen tanks and other necessary equipment which includes a complete surgical outfit, etc. The building is equipped with hot and cold water, hot-water heat with bathrooms and telephones on both floors.

There are four trained nurses in the regular staff; one superintendent, one assistant nurse, and two in training.

The cut of 25c. per month is made on every employee of the company from

general manager down to trapper, and this has been hardly enough to support the institution. The deficit, however, has been made up from time to time by taking in patients from other industrial plants or railroads when the hospital was not crowded with people from the Continental Coal Corporation's plants.

The other mining companies and the Louisville & Nashville R.R. are permitted to send their employees at a rate

manager of the Continental Coal Corporation. It is the intention of the management to ask the employees in each of the four divisions of the company's operations to elect a man to represent the miners on the advisory board of the hospital. This will be done on Jan. 1.

The medical staff of the hospital is as follows: J. Harry Hendron, 1st vice-president of the Kentucky Medical Association, Cary, Ky.; F. D. Haston, Arjay,



THE HOSPITAL OF THE CONTINENTAL COAL CORPORATION AT PINEVILLE, KY.

of \$10 per week for each patient, and at the present time, three of the L. & N. R.R. Co.'s employees and one of the Pioneer Coal Co. are under treatment in the hospital.

Its success has been marked. Serious cases have been taken care of and complete recoveries made, in instances where it would have been impossible to have accomplished the same results at the miners' homes.

The general public is admitted when it is possible to do so, the fee ranging from \$15 to \$25 per week. The latter charge is for the use of a private ward and special nurse. Tuberculosis, pellagra, diphtheria, typhoid, and like diseases are not treated at the hospital, it being an emergency hospital only.

THE MANAGEMENT

An advisory board has been formed comprising the medical staff and general

Ky.; E. M. Howard, Rim, Ky.; W. T. Flanagan, Pineville, Ky.; O. P. Knuckles, Pineville, Ky.; B. E. Giannini, Straight Creek, Ky., the last acting as surgeon; the hospital is open to all physicians and surgeons in southeastern Kentucky.

The present building is rented, but it is the ultimate intention to interest all the other mining companies in this section in the erection of a large fireproof hospital; the deduction from the wages of the employees for its support being made general throughout the field.

The building should be large enough to accommodate the patients from the entire mining field of southeastern Kentucky. As is well known, the miners always migrate to a considerable extent, and if the building were commodious enough for the use of the whole region, the miner would then be protected wherever he worked, so long as he did not leave this part of Kentucky.

*Vice-president and general manager, Continental Coal Corporation, Pineville, Ky.

Coal and Coke News

From Our Own Representatives in Various Important Mining Centers

Washington, D. C.

There has been a general disposition to criticize the Supreme Court very severely in connection with the anthracite decision during the past week, it being the feeling that this decision entirely ignores the current agitation regarding the advance in coal prices and the fact that as alleged the decision will tend toward the raising of prices for the staple.

As against this criticism it is asserted by supporters of the decision that as soon as the scarcity of coal is over, competition which it is supposed will be stimulated as a result of lower freight rates for coal will tend to keep prices down. The whole crux of the situation seems to be whether there can be a reduction in the cost of transporting anthracite coal as fixed by the railroads.

Undoubtedly if the charge for carrying coal can be cut, this reduction will offset the tendency toward an advance which appears to be set at work under the terms of the decision in the coal roads' case. There is, therefore, a disposition in legislative and executive circles to await the result of the investigation of the coal strike of last year, and of current coal prices which is in progress in the Department of Commerce and Labor, and the bringing of some relief through decisions of the Interstate Commerce Commission before dealing in any drastic way with the anthracite-coal situation. From present appearances the subject is likely to be considerably less of a factor in the situation than was expected when the opinion was first handed down.

THE ILLINOIS CENTRAL DECISION

The Interstate Commerce Commission has rendered an important decision in regard to the investigation of alleged irregularities in mine ratings among the coal mines served by the Illinois Central Railroad Co. In this case it appeared that a protracted controversy had been going on as a result of difference of opinion between the coal mines and the Illinois Central.

There are 168 coal mines on that road, of which 114 are local to its lines, 45 are junction-point mines, which have other railroad connections and nine have an outlet by river. Only 20 mines on the entire system average more than 10 cars per day throughout the year, and only one as much as 27 cars per day.

The junction-point operators contended that their mines should be rated at their

full capacity, just as if they were not served by any carrier other than the Illinois Central, and regardless of the tonnage which they shipped over other roads. The Illinois Central and the local mine operators contended that the basis of rating should be the actual shipment over the Illinois Central.

Beginning in 1907, the road from time to time issued rules governing the rating of mines and the distribution of cars. These rules were protested against by mine operators, and, in 1910, on request of the parties, the commission attempted informally to harmonize the differences. The operators as a whole then formed an association and agreed upon rules, which rules were adopted by the railroad company.

Operating conditions on the Illinois Central were greatly disturbed and disorganized as the result of a strike among its employees and this resulted in dissatisfaction among the mine operators, which culminated in their abandoning all efforts to agree upon a basis of rating and the adoption of resolutions under which the entire responsibility was thrown upon the railroad company.

The railroad promulgated new regulations, which were even more unsatisfactory to the operators than those which were thus superseded. The old rules were returned to for the remainder of the season, and the commission was requested to investigate the situation and decide the controversy.

WHAT THE COMMISSION DECIDED

The holding of the commission is that the ratings of the mines ought to be based upon the several hourly capacities for production; that the mines that have an outlet by river shall be treated as junction-point mines; that upon days for which the junction-point mine orders no cars from another carrier it shall have its coal rating on the Illinois Central; that upon a day for which it orders cars from one other carrier, its rating on the Illinois Central for that day shall be 75% of its full rating; and that upon a day for which it orders cars from two other carriers its rating from the Illinois Central for that day shall be 50% of its full rating. In speaking of the general situation, the commission says:

In the annually recurring period of shortage of coal cars there is a great demand for fuel and, generally speaking, each mine, whether junction-point or local, is able to sell all the coal it can mine and ship. If the junction-point

mine, served by two lines, is permitted to assert its full capacity against each of those lines, it is able to secure 100 per cent. of its needs whenever each of those lines has as much as a 50 per cent. car supply. It would thus be able to work substantially full time, while the nearby local mine would be able to work only one-half or one-third time, and the result would be that miners and laborers would seek employment with the junction-point mine where they could work full time rather than with the local mine that was able to work but part of the time. This makes it impossible for the local mine owner to maintain an organization or to work his mine efficiently or economically, and imposes upon him an extra cost in the production of coal.

TRANSPORTATION BY WATER

Commissioner of Corporations Luther Conant has rendered a report on the subject of transportation by water in the United States, in the course of which he discusses the relation between the coal roads and the anthracite-carrying vessels of the United States. Mr. Conant says in part:

Nearly all the important anthracite coal fleets engaged in the North Atlantic coastwise trade are owned by the two great anthracite railroads. On the Great Lakes all the important package-freight lines are owned by railroads. In the local package-freight traffic there are a large number of independent water carriers. In the transportation of bulk freight (other than grain), such as ore, coal and lumber, the railroad boat lines have practically no part. Several of the principal lake fleets handling these products, however, are under the control of important industrial concerns, the largest being that of the Pittsburgh Steamship Co., controlled by the United States Steel Corporation.

On the Mississippi River system steamboat lines have largely succumbed to railroad competition or to natural difficulties. Most of the few remaining packet lines are independent of railroads, but are usually feeble competitors. The principal item of traffic today on the Ohio and Mississippi Rivers is bituminous coal, and the great bulk of through traffic in this commodity is handled by a single industrial concern, the Monongahela River Consolidated Coal & Coke Co., a controlling interest in which is, in turn, owned by the Pittsburgh Coal Co.

Pennsylvania

ANTHRACITE

Taylor—Two men were killed by an explosion in the Taylor mine of the Delaware, Lackawanna & Western Co., Dec. 20. The explosion was started by naked-flame lamps.

Scranton—A bed of excellent anthracite coal has been discovered at Pocono Summit, by Isaac Miller, proprietor of a Pocono Summit Hotel. The discovery was made upon Mr. Miller's property, and while he does not state the value of the find, it is evident that it will again stir up the coal fever in this section.

Pottsville—John Fahy, who has been president of the Ninth District of the United Mine Workers of America for more than 12 years, has been defeated for reelection by James Matthews, of Shenandoah. The vote, as announced, was 4319 to 8165.

Pittston—Twelve hundred striking miners returned to work, Dec. 12, after the Pennsylvania Coal Co. threatened to enter a complaint against officials of the union for ordering a strike.

Wilkes-Barre—Fifteen hundred men and boys struck at the Maxwell colliery of the Lehigh Coal Co., Dec. 18, because engineers refused to join the union.

BITUMINOUS

Connellsville—Parties are now reported taking up options on the purchase of coal in lower Tyrone Township, which adjoins the Cochran holdings. Fifty dollars an acre is being offered, and it is said that some of the farmers have already signed the papers to transfer their land for this price.

Avella—Considerable activity was manifest in the coal business of this section during the past few days. A block of over 750 acres fronting on the Wabash is now under option. This is on the north side of the railroad, and is considered one of the most desirable properties in this section of the county. Other blocks have been optioned recently, but some are away from the railroad frontage.

Johnstown—A dozen or more miners are suffering from severe bruises, and the house in which the men lived is a total wreck as the result of a powder explosion. One of their number went to a dark closet to get a keg of powder for use in blasting. As he stooped to pick up the keg, the lighted lamp in his cap fell into the powder, with disastrous results.

West Virginia

Charleston—The children are being moved out of the West Virginia strike zone. It might be an excellent idea to move the strikers out also. There is plenty of work at good wages waiting for them in other coal regions.

Gilmer—Complaint was filed with the Interstate Commerce Commission, Dec. 17, by the Mecca Coal Co., of Gilmer, W. Va., against the Coal & Coke Ry. Co., alleging discrimination in the distribution of coal cars by the defendant railroad. It is charged that the complainant is

discriminated against in favor of the Davis Colliery Co., which it is alleged is almost identical in ownership with the railroad company. The commission is asked to secure a fair distribution of cars.

Alabama

Birmingham—Representatives of the United Mine Workers of America are said to be visiting various sections of the mining district in Alabama, quietly making efforts to organize the union. The best of feeling seems to prevail between miners and operators throughout the coal-bearing section, and the operators do not appear to be the least disturbed as to the labor conditions prevailing.

Russellville—One man was killed and one severely injured by the premature explosion of a blast at No. 3 washer of the Sloss-Sheffield mines, Dec. 3.

Ohio

Columbus—For the first time in the history of the organization in the state no benefits are being paid by the Ohio branch of the United Mine Workers of America. Prospects for a continuation of peace among the miners and operators in the state appear to be excellent.

Indiana

Linton—The Monon R.R. Co. is surveying and preparing plans and specifications for the construction of the Bedford and Bloomfield branch from Switz City to the Linton coal field. When completed the Monon will reach all mines in the Linton field, making four roads in all prepared to haul coal out of this field.

Terre Haute, Ind.—The development of new territory in the Indiana coal field by companies which will equip mines for large output will make next year's total tonnage, if there be no setback in general industrial conditions, go at least 3,000,000 tons in advance of the state's record of 16,000,000 tons. These new mines are to be sunk northwest of Terre Haute, although there is to be extensive development south of the city in Sullivan County.

Illinois

Taylorville—Coal companies in Christian County have complained to the Interstate Commerce Commission of the rates on coal over the Atchison, Topeka & Santa Fé and other railroads to interstate points. It was said that these mines should not be grouped for rate-making purposes with mines further south, but that they should be protected by differential rates.

Kentucky

Whitesburg—It is said here that the Lexington & Eastern has reached an

agreement with the Consolidation Coal Co. on the coal rates from McRoberts. For the present at least the Consolidation Coal Co. will not extend its road, the Sandy Valley & Eastern, into McRoberts, as announced a few days ago.

Lexington—A first-aid contest is to be held in Lexington next May and nine teams are already pledged to appear. H. D. Easton is chairman of the committee in charge of the contest.

Beaver Dam—The Williams and Taylor mines, in Ohio County, Ky., which have been practically shut down for several months as a result of inability to obtain cars for loading, have received a number of cars, and work has again started. Four thousand tons were loaded out in one day last week.

Wallsend—The Continental Coal Corporation has resumed operations at its big coking plant at Wallsend, in Bell County, Ky., after a period of idleness extending over a number of years.

Tennessee

Knoxville—The Southern Appalachian Coal Operators' Association, comprising operators in the eastern Kentucky and Tennessee districts, met recently at Knoxville, Tenn., to discuss the ultimatum of the Louisville & Nashville R.R. Co. requiring the loading of the entire output of mines on its lines for railroad use on Tuesday, Thursday and Saturday of each week until the end of December, with the alternative of having no cars furnished on those days for commercial coal. Considerable indignation was expressed, but no remedy seemed available. Some operators have closed their mines, and others are loading out commercial coal, chancing confiscation by the railroad.

Kansas

Pittsburg—Two hundred men were temporarily thrown out of employment, Dec. 15, when mine No. 19 of the Weir Coal Co. was closed down by the order of the state mine inspector. It is said that the company had violated the state law by not placing safety catches on the cage. These will be placed immediately, and the mine will resume operation.

New Mexico

Albuquerque—The Lyon Mining Co., recently organized with a capital stock of half a million dollars, is organizing its force for business. This company has gold, nitrate, silver and coal mines to be developed.

Oklahoma

Oklahoma City—Hearings will soon be held by the Corporation Commission on the application of a number of coal companies for the establishment of group rates for coal shipped from the mines in

the eastern part of the state. It is proposed to have the local rates from the central railroad yards in a district where there are a number of coal mines within a short radius to apply to coal shipped from all these mines to points outside of the group. For movements from one point to another within the same district, it is proposed that regular mileage rates shall apply.

Wyoming

Rock Springs—Shipment from the new property of the Lion Coal Co. commenced on Dec. 17, and it is anticipated quite a tonnage will be distributed to the trade during the balance of the winter. The coal is of excellent quality and mines in large blocky lumps. Quite a large area of coal has been opened up and the output should increase rapidly.

Washington

Seattle—The United States Government has filed suit against the Pacific Coast Coal Co., the Northwestern Commercial Co., and the John J. Sesnon Co. for \$100,000, it being alleged that the government was defrauded of this sum by the three companies which submitted collusive bids for supplying Alaska army posts with coal.

Foreign News

GERMANY

Dortmund—Forty-eight coal miners are believed to have been killed by an explosion of firedamp in the Achenbach mine, Dec. 18. Thirty-five bodies have been recovered from the pit and 13 are still missing. The explosion was so violent that it is believed that all were killed.

Saarbrücken, Rhenish Prussia—The members of the Christian Labor Union voted, Dec. 15, to strike, Jan. 2. The strike will effect the Saar coal mines. The other Catholic unions, including 15,000 members, voted to await the fulfillment of the mine owners' promise of higher wages.

ENGLAND

Newcastle—Northumberland coal owners are asked to consider the question of a further advance of wages to the men.

Personals

Charles B. Kinne has resigned the presidency of the Northeastern Coal Co. and the coal-purchasing department of the Central Leather Co., to take the management of the Cobaugh mine, near New Bethlehem, Penn., which he has been instrumental in selling to a new syndicate. The mine will start up in a few days, with an output of 500 tons daily. The

new company's name will be the Pittsburgh & Northern Coal Co.

According to information based on unofficial returns of the recent referendum election, given at headquarters of the union, Dec. 18, John P. White, president of the United Mine Workers of America, has been reelected.

It is rumored that Charles M. Barnett, who recently resigned the presidency of the Chesapeake & Ohio Coal & Coke Co., will head a new company financed by a millionaire mine owner named McKell, and that main offices for this company will be established in Norfolk.

Construction News

Hillsboro, Ill.—The Nokomis Coal Co. has started to sink its shaft and is running three 8-hr. shifts night and day. They expect to be hoisting coal by the first of next July.

Colliers, Ohio—The Panhandle R.R. has a force of men at work on the bridge east of Colliers, the last one to be put in permanent shape of those damaged by the recent cloudbursts and floods in that section.

Rockwood, Penn.—James F. Broagan & Co. have contracted with the Baltimore & Ohio R.R. Co. to build three new tracks along the Somerset & Camden branch, and considerably enlarge the Rockwood yards.

Birmingham, Ala.—The Panama Coal & Iron Co. has acquired the holdings of the Warren Coal & Land Co., amounting to 35,000 acres in the Black Creek basin. The developments which the company proposes will involve an outlay of \$1,500,000.

Cambridge, Ohio—It now appears that the proposed extension of the Pennsylvania Lines through Powhatan and westward through the Captina valley to develop the rich coalfields of southern Belmont County, will become a reality in a year or two.

Sykesville, Penn.—Over 300 men are now employed on the big coke oven contract for the Cascade Coal & Coke Co., at Sykesville. A large steam shovel has been shipped and will probably be at work within a few days. The foundations for some of the coke ovens have been started and the work is being rushed while the nice weather lasts.

Scottsdale, Penn.—Deeds have been made whereby John R. Byrne and his brother become owners of the Methias tract of coal, which lies in Sewickley Township, Westmoreland County, and is a part of the Yukon coal and coke developments. The Byrne interest will at once begin the building of a 60-oven coke plant, it is said, and will also commence on tipples, tracks and other improvements, it being their intention to ship coal as well as to manufacture coke.

Pineville, Ky.—A power plant is to be erected at or near here to furnish electricity for this place, Middlesboro and the various coal mines in this locality, known generally as the Bell County field. The full capital stock of \$1,000,000 has been subscribed and contracts have been made for the purchase of the local plants at Pineville and Middlesboro. Not only will the new plant furnish power for those cities, and the mines, but it will also furnish electricity to an independent company, which is to build a trolley line

that will connect Pineville and Middlesboro with the coal mines on Clear Creek, Straight Creek, Four Mile and other points in Bell County. The company is now advertising for 6000 poles on which to string its wires. Construction work will begin in the early spring.

New Incorporations

Belleville, Ill.—The Illinois Coal & Mining co.; capital stock, \$5000.

Medora, N. D.—The Medora Coal Co.; capital stock, \$25,000. Filed Dec. 2.

Cedartown, W. Va.—Preston Fuel Co.; capital stock, \$300,000; to operate in Preston County.

Columbus, Ohio—The Middle States Coal & Coke Co. will develop 1500 acres of coal land on Laurel Creek, near Olmstead, W. Va.

Connellsville, Penn.—Inter Railroad Coal Co. has been organized here. Capital, \$360,000. President, J. P. K. Miller, Scottsdale, Penn.

Lisbon, Ohio—The Duquesne Coal Co.; capital stock, \$2000; mining and dealing in coal and kindred products.

Hillsboro, Ill.—The Fayette County Coal Co. has been formed to take up 3200 acres of coal lands in Montgomery and Fayette Counties. Consideration, \$32,000.

Ashland, Ky.—The Big Sandy Fuel Co. has been organized with a capital of \$10,000. The incorporators are: Ralph Chatfield, Virginia M. Chatfield and O. P. Chatfield.

Mercer, Penn.—Applications will be made Jan. 6 by Robert P. Cann, S. M. Stevenson, Norman Kilner and John Faull for the charter of the Grove City Coal Mining Co.

Auburn, Maine—Eastern Block Coal Co., Auburn, Maine, to manufacture and deal in fuel, briquettes, etc.; capital, \$50,000. President E. M. Hatch; treasurer, J. A. Pulsifer, Auburn.

Kittanning, Penn.—Application will be made Dec. 23, 1912, by J. A. Beam, J. F. Joy and W. C. Beam for the charter of an independent corporation, to be called the Pine Run Coal Co.

Philadelphia, Penn.—Application was made, Dec. 21, 1912, by John Barnes, Harry E. Bird and Edward L. Clarke, for the charter of an intended corporation to be called the Barnes Coal Co.

Nashville, Tenn.—Warrenfells Mining Co., Hamilton County, has been organized with a capital of \$21,000. Incorporators are A. P. F. J., W. H., V. B., M. K. and R. Warrenfells and V. E. Johnston.

Augusta, Ga.—J. Frank Ellis, T. S. Raworth and C. I. Bryans, of Augusta, have applied for a charter to organize a coal and ice company, with a capital of \$20,000, to be known as the "Elks Ice & Coal Co."

Tice, Ill.—The Coal Bank Mining Co., of Tice, Ill., has been incorporated with a capital of \$1,000,000, for mining and marketing coal. The incorporators are John B. Grosbill, Hans Vindfeld Nelson, and Marie M. Grosbill.

New York—The Atlantic Coast Coal-ing Co. has been incorporated in Manhattan, N. Y., for loading, transporting and dealing in coal, etc.; capital, \$110,000. Incorporators, J. S. Dale, G. W. Picht, T. W. Sprague, New York City.

Ashland, Ky.—The Blackstone Coal Co., of Ashland, Ky., has been organized with a capital stock of \$500,000. The incorporators are: John F. Hager, J. W. M. Sewart, K. M. Fitzgerald, S. E. Harmon, and L. S. Wilson, all of Ashland, Ky.

Cleveland, Ohio.—The Pennington Mining Co., of Cleveland, has been organized for mining and dealing in iron ore and coal, with a capital stock of \$100,000. The incorporators are: J. C. Merrick, G. W. Cottrell, C. C. Roads, F. W. Dellenbarger and Henry G. Dodge.

Nortonville, Ky.—The Norton Coal Mining Co. has been incorporated, with a capital stock of \$300,000, by Sterling S. Lanier, Birmingham, Ala., and Sterling S. Lanier, Jr., and T. F. Callard, both of Nortonville. The company contemplates extensive purchases and development of coal lands in that vicinity.

Ashland, Ky.—The Kelley Coal Co., at a meeting held at Ashland, Ky., recently decided to discontinue business as a corporation and to surrender its charter, and adopted resolutions to that end. The company is organized under the laws of West Virginia, and has been engaged in operations in Eastern Kentucky.

Duquoin, Ill.—A new mining corporation, with a capital stock of \$200,000 has been formed by a number of Franklin County capitalists to take over the mineral holdings of W. W. Adams, L. W. Brand, and J. T. Chenault. The new concern will be known as the A. B. C. Coal Co., and has the following officers: President, J. T. Chenault; vice-president, W. W. Adams; secretary-treasurer, L. W. Brand.

Industrial News

Liberty, Mo.—The Missouri coal mines are now in full operation and are turning out 300 tons of coal a day.

Clearfield, Penn.—Albert Soderland has opened a coal mine on his farm and is furnishing Moshannon vein coal to the local trade.

Butler, Penn.—The Denny Brothers, Michael, W. E., Charles T., N. L. and E. A., will start work on a new coal mine, at the head of North Washington St., in the city limits.

DeKalb, Ill.—The annual meeting of the DeKalb Fuel & Mercantile Co. was held at the office of the company, Dec. 7. A 7 per cent. dividend on the stock of the company for the year was declared.

Connellsville, Penn.—An Eastern syndicate of coal operators has taken over about 35,000 acres of land in the Indian Creek valley, and it is believed that active operations in that territory will be well under way by early spring.

Scranton, Penn.—Negotiations are pending for the purchase of the Central Coal Mining Co., of this city, by Theodore Hogan, a coal operator, of Pittston. The holdings of the Central Coal Co. consist chiefly of 97 acres of good coal land in Luzerne County.

Gillespie, Ill.—The Superior Coal Co. is hauling water from Alton for its mines Nos. 2 and 3. The continued dry spell has exhausted all the water in the reservoirs at these mines. The water train consists of a number of tank cars and makes two trips daily.

Henrietta, Okla.—The Oklahoma Coal Co., whose mine is turning out 2100 tons of coal a day, has closed a contract with the Cotton Belt R.R. to supply it with 500,000 tons of coal. It is estimated that the mines in the Henrietta field produce 5000 tons of marketable coal daily.

Central City, Ky.—The Gibraltar Coal Co., Central City, Ky., which is managed by W. A. Smith, is considering the opening

of a new shaft at Silver Creek, near that city, on the Louisville & Nashville, having acquired property at that point with a view to immediate development.

Pittston, Penn.—A tract of coal land between Hudson and Miner's Mills has been purchased by representatives of Philadelphia capitalists from the Central Coal Mining Co., of Scranton. The price is said to have been \$84,600. The coal is about half a mile from the D. & H. R.R.

Marion, Penn.—It is said that the Rochester & Pittsburgh Coal & Iron Co. has secured an option on about 3000 acres of coal just east of Clarksburg from the New York Central R.R., who purchased the tract less than two years ago. Diamond drills are now at work making tests.

Cannelburg, Ind.—Drillers employed by the Mutual Mining Co. have struck a 5-ft. seam of what looks to be a good quality of bituminous coal. The coal was struck at a depth of 304 ft., after 35 ft. of slate had been passed through, and is believed to be the same as that known as the Linton No. 7.

Birmingham, Ala.—The Alabama Consolidated Coal & Iron Co. Stockholders' Committee have announced the details of a plan for the rehabilitation of the property. It provides for an assessment of \$30 a share against the preferred stockholders, and \$15 a share against the holders of common stock.

Newcastle, Ala.—About 250 ovens will be fired up at once by the Pratt Consolidated Coal Co. for the purpose of filling a 40,000-ton order for coke to be delivered within the next six months. These ovens have been idle for the past three years. The contract is said to involve a sum of \$250,000.

Oklahoma City, Okla.—The Folsom-Morris Coal Mining Co. took charge of 10,000 acres of coal property in the Lehigh district Dec. 6, succeeding the Western Coal Mining Co. The consideration was \$300,000. The new company is a holding concern for the Atchison, Topeka and Santa Fe R.R.

There are four mines in operation, delivering 2500 tons daily, of which the Santa Fe uses 400 to 500 tons. Dorsett Carter, of Purcell, is president of the Folsom-Morris Co., and will manage the property.

Uniontown, Penn.—Thomas Dawson, of Charleroi, Penn., is drilling test holes to the Pittsburgh coal vein on the site of the Marion Coke Co.'s new plant at Big Meadow Run. Holmes A. Davis, of the Marion Coke Co., has been here for the past few days managing the affairs of his concern. The work of sinking the shaft will start as soon as these tests are made.

Princeton, Ind.—The Princeton Mining Co.'s mine has been shut down by order of the state mine inspector until additional fans are installed at the bottom of the airshaft. This will throw 250 men out of employment.

This mine has the deepest shaft in Indiana, the men working at a depth of 440 ft.

Knoxville, Tenn.—The Louisville & Nashville R.R. has announced that it will take the total output three days of each week of all coal mines on its lines, from Dec. 14 to 25, inclusive. This step is the outcome of the heavy traffic and the shortage of fuel. The only exceptions are coal mines which are supplying coal contracts to railroads.

Chattanooga, Tenn.—It is reported that the Chattanooga Gas Co., the Chat-

tanooga Iron & Coal Co., and the Durham Coal & Iron Co., all of this city, have been consolidated, and will secure and operate large coke ovens on the properties of the Chattanooga Estates Co., north of the city, which comprise large tracts of coal land and a number of mines.

Connellsville, Penn.—It has been repeatedly stated that the Connellsville coke region would have some coal left after it went out of the coke business, but the statement has never been taken seriously. It is, nevertheless, true that at least one enterprising owner is already reported to be going after the deeper seams. These developments will be of decided interest.

Collinsville, Ill.—Rumors are current that several of the best equipped mines in Illinois will be sunk soon. Options on 8000 acres of valuable coal land in Madison County have been secured, providing for the payment of \$25 an acre for the coal and mineral rights under the land. The tract is situated on the St. Louis & Illinois Belt R.R., which has been recently completed.

Connellsville, Penn.—A tract of coal at Indian Head will be opened up at once and tested by Lloyd Reese of that place. In event of its proving up to expectation, the Indian Head Coal & Mining Co. will be formed. Indian Creek Valley coal is being sought by a number of coal men. One steel concern recently sent representatives to look over the field and ascertain if the coal can be used in by-product coke ovens.

Connellsville, Penn.—John H. Hillman, Jr., together with Holmes A. Davis, has acquired the Marion plant of 25 ovens and has commenced the construction of a plant of 40 ovens at Bellevernon.

It is also announced that the Hillman-Davis combine has purchased 75 acres of coal on the Monongahela River, south of Brownsville, and will build a plant of 40 ovens, under the corporate name of the Luzerne Coal & Coke Co.

Pittsburgh, Penn.—Another section of the Greene County coal fields is to be opened by Connellsville capitalists. S. F. Ruth, president of the Connellsville Title & Trust Co., announced, Dec. 15, that he has bought 800 acres in Gilmore and Wayne Townships, for \$300,000, from W. F. Patterson, of Waynesburg. Ruth is acting for the Connellsville men who have acquired large tracts of Greene County lands. Plans have been made for the construction of a railroad that will give the field a direct connection with Pittsburgh. The line will start at Fairmont, W. Va., run through Waynesburg and Bridgeville, Penn., to Pittsburgh using the tracks of the Wabash Pittsburgh Terminal R.R.

Pottsville, Penn.—A sequel to the recent visit of the Girard trust to the Schuylkill coal lands held by them and an inspection of the water shed of the Girard Water Co., whose dams up to this time have been located a little north of Girardville was their decision to abandon the 300 or more acres of watershed and to throw them open for coal mining because the feed springs had already been destroyed by adjacent mining which made it necessary to procure another site for reservoirs. Next Wednesday the Board of City Trusts will pass upon ten separate bids for a lease of 99 years. The bidders are the Mill Creek Coal Co., Susquehanna Coal Co., Madeira Hill Coal Co., Dodson Coal Co., Lehigh Valley Coal Co., and others.

Coal Trade Reviews

Current Prices of Coal and Coke and Market Conditions in the Important Centers

General Review

The anthracite situation at the larger distributing centers is gradually but certainly swinging around to more normal conditions. The receipts generally are showing a slight improvement, while the urgent demand is becoming less insistent and the premiums are steadily easing off. However, conditions still remain hard at the more remote points. Arrivals are small with indications of becoming even less and premium coal still commands a ready sale, although purchasers are becoming more independent on specifications.

The Eastern bituminous demand is spotty and confined to small tonnages, but prices continue firm and all arrivals find a ready sale. The car supply is poor and if there is no improvement in this respect the outlook is serious. The operators not under contract are netting handsome profits and the appearance of more seasonable weather may effect a sharp advance in the prevailing premiums. Supplies are undoubtedly restricted and anticipation of the customary suspension in mining over the holidays has caused consumers generally to increase their commitments.

Ohio dealers are known to be short in their supplies and the cold weather will undoubtedly precipitate an active market. The car supply has continued fair during the week, but there are indications of a shortage developing. The best feature of the market at Hampton Roads is the heavy tonnages being dumped for both exporting and bunkering; it is estimated that the December loading will exceed that of November by over 100,000 tons.

The recent demand of the Louisville & Nashville R.R. for all the tonnage produced on its lines during three days of the week went duly into effect and industrial concerns are finding it impossible to obtain adequate supplies. This has created quite a stir locally, and with no coal in the market, prices are practically unquotable.

There has been a reduction in the demand for domestic, but steam continues

strong and readily overcame a tendency to soften in slack; quotations are showing a rising tendency. At St. Louis the conditions are the reverse, there being plenty of coal on the verge of demurrage, some of which is being forced on the market at any price which can be obtained.

Boston, Mass.

Prices are firm all along the line. Such bituminous as reaches the piers finds a ready sale and the market may be considered fairly active. The demand is still spotty, however, and is confined to small tonnages. It is significant that some of the large corporations have bought spot coal at New York during the past week and the prediction is freely made that there will be much larger sales in that direction before January has gone far. According to all reports the car situation grows worse rather than better and if railroads, like those moving the output of the Maryland and West Virginia districts, are able to do no better than they have in December we are surely facing a bad prospect for the next three months. Vessels and steamers are still under severe detention at Baltimore and Hampton Roads and there seems to be no chance for relief for a long time to come. Those Pennsylvania operators who did not go in heavy for contracts last spring and so have free coal are beginning to net handsome profits. The mild weather permits buyers to temporize, but given seasonable conditions spot coal will command a liberal margin over present prices.

All-rail movement has been reasonably steady. The small consumers have been pretty well served but the larger plants buying from the big shippers have been able to get only hand-to-mouth deliveries. November and December have cut into the reserve stocks and the more anxious have been buying coal *en route* at more or less fancy prices.

Receipts of anthracite this week have been quite small. Philadelphia tows have begun arriving again, but news from the other end shows that the city market is drawing so heavily on its supplies that New England will get a much less tonnage for the present than in previous months. A little more is being had from New York but not sufficient to make a showing. Premium coal continues to be a ready sale, but buyers are insisting on a larger proportion of stove than they

have had heretofore. Egg size is noticeably easier than a few weeks ago.

Present wholesale quotations are about as follows:

Clearfields, f.o.b. mine.....	\$1.45@1.90
Clearfields, f.o.b. Philadelphia.....	2.70@3.15
Clearfields, f.o.b. New York.....	3.00@3.50
Somersets, Cambrias, f.o.b. mine.....	1.60@2.00
Somersets, Cambrias, f.o.b. Philadelphia	2.85@3.25
Pocahontas, New River f.o.b. Hampton Roads.....	3.50
Pocahontas, New River on cars Boston.	3.55@3.75
Pocahontas, New River on cars Providence.....	2.50@3.75

New York

Bituminous—The appearance of a heavy snowstorm in New York the early part of the week tightened the situation up materially. This arrived at a very opportune moment as the market had all the appearances of being on the verge of easing off to the customary low point which usually prevails over the holiday period. According to reports from the mining region this storm was not in evidence in the bituminous fields but this did not effect the market locally.

The car situation has not shown any improvement. For the first two days of the current week the supply was good but such is always the case the first part of the week, the roads getting ahead in their supply of equipment over the week end. Operators on the Pennsylvania railroad particularly have suffered from lack of equipment.

It is too early at the present time to advance any reliable predictions as to what the effects of the change in weather conditions will be. Some operators are of the opinion that this will precipitate a runaway market and result in a spectacular advance in prices to say a minimum of \$3.50. The more conservative, however, are inclined to the opinion that it will only have a mildly stimulating effect on trade.

We quote New York prices slightly advanced over last week as follows:

West Virginia, steam.....	\$3.15@3.25
Ordinary grades, Pennsylvania.....	3.15@3.25
Fair grades, Pennsylvania.....	3.15@3.25
Good grades, Pennsylvania.....	3.20@3.30
Best Miller, Pennsylvania.....	3.30@3.40
Georges Creek.....	3.50

Anthracite—With a heavy snowstorm prevailing in the hard-coal fields as well as locally, there will doubtless be a slight tightening of the situation in anthracite. However, premiums are becoming less and the insistent demand is showing a tendency to ease off. The market in New York has been gradually steadying up for several weeks and is now in a decidedly better position than has been anticipated for it.

Car supply in the mining regions has been rather poor and this has curtailed production slightly, but on the whole conditions have been good. The change in weather will not materially effect mining operations. Work at the mines is slow and intermittent over the holiday period at the best, and it is doubtful if the mines will be able to use all the equipment with which the railroads are able to supply them in any event.

We continue New York prices unchanged as follows:

	Upper Ports	Lower Ports
Broken.....	\$5.00	\$5.00
Egg.....	5.25@6.00	5.20@5.90
Stove.....	5.25@6.50	5.20@6.50
Chestnut.....	5.50@6.50	5.45@6.50
Pea.....	3.50	3.45@3.60
Buckwheat.....	2.75	2.25@2.60
Rice.....	2.25	1.80@1.95
Barley.....	1.75	1.25@1.70

Buffalo, N. Y.

The late mild weather has tended to hurt the coal trade, but sellers, both of anthracite and bituminous, know that the supply is at best, not in excess of the consumption, and have refused to yield to any new demands of consumers. The anthracite companies have been tempted to ship much larger quantities to single jobbers and consumers, but do not yet feel that the situation will warrant it.

Some bituminous shippers report that their small customers are holding off, supposedly with the idea of getting cheaper coal later, but larger consumers seem to be better posted and continue their orders. Such a change is rather welcome than otherwise to the operators. It is not believed that there will be any weakening of bituminous prices right away. One reason for the present firmness is that the mild weather has been entirely offset by the scarcity of cars and miners. The disposition of the railroads to take more coal on their contracts than formerly and to confiscate more also, gives additional strength to the market. A third reason for firmness is that the mining will be light through the holiday season while the railroad traffic, especially in the passenger department, will increase; the roads had to look out for themselves.

Bituminous prices remain strong on the basis of \$3 for Pittsburgh lump, \$2.85 for three-quarter, \$2.75 for mine-run and \$2.50 for slack, with Allegheny Valley about 25c. less. Coke is as strong as formerly, at \$6.50 for best Connellsville foundry.

There has not been as much unsteadiness in bituminous on account of the closing of the Lake trade as was expected. Slack, which is commonly affected most, rules quite as strong as the sizes.

Anthracite shippers will be interested in the colder turn of the weather. They had already reduced the premium on independent anthracite from \$2.50 to \$1.25, at which price it is now selling. A shipper announces that he expects to see the premium entirely disappear in a week

or two, unless the weather becomes too severe. The mild fall, for the first time on record, has been a cause for rejoicing on the part of anthracite shippers.

Baltimore, Md.

Anticipating the Christmas holiday cessation at the mines, consumers increased their coal commitments during the week, with the result that the market was even more active than during the week previous. Those receiving fuel under contract, requested maximum shipments, while others purchased all free coal offered. Prices of all grades advanced from 5 to 10c., and there wasn't much coal to be had at these higher quotations. Knowing that the fuel supply will be restricted during the next eight or ten days, because of the holiday idleness at the mines, some of the large operators are holding out for still higher prices. The limited car supply is still a source of trouble to local operators. They are making the most of the situation, however, and are rushing deliveries as fast as it is possible for them to do so.

Spot business for the week was exceptionally heavy, most of the buying being done by consumers who feel that they can often do better by buying from hand-to-mouth rather than by tying themselves up under contracts, but they profited little during the past few weeks by this method. Operators who were able to furnish slack, received their own prices for it, the demand being exceptionally heavy throughout the week.

Considerable Southern business developed the latter part of the week. At least three vessels received coal at the piers in this city, destined for various ports of the South. In the past two years, one or two of the local companies have paid particular attention to developing trade in some of the Southern states.

The coke market remains firm, with Connellsville coke quoted around \$4, and West Virginia coke from \$3.50 to \$3.75 per ton.

Columbus, Ohio

Coal conditions throughout the central part of the state do not show much of a change over the past week. Cold weather has set in and from all indications it is probable that the shippers may face an equipment shortage. The deliveries are not being made quite so promptly and the mines have shown a falling off in production during the last week.

The steam grades still continue the strong feature of the market and with the weather conditions that have prevailed the railroads have been able to make quite a little progress with deliveries. It is reported by coal men that orders are away ahead of deliveries and it is expected that if the present demand continues from the industrial concerns

that prices may increase. Nearly all transfer points are on the verge of a tie up.

The domestic trade is a little slow at this time, but it is known that dealers are short on supplies. If a snowfall were to come it is probable that transportation would be tied up and a congestion in the coal movement would be experienced.

The car situation during the past week has been worse, as jobbers claim that cars have been scarcer than ever and there is not much outlook for any improvement.

Quotations in Ohio fields are as follows:

	Hock- ing	Pitts- burgh	Pome- roy	Kana- wha
Domestic lump.....	\$2.25		\$2.35	\$2.35
2-in.....	2.00	\$1.60	2.00	2.00
Nut.....	1.50		2.00	
Mine-run.....	1.75	1.50	1.75	1.75
Nut, pea and slack...	1.00		1.25	1.10
Coarse slack.....	1.00	1.25	1.00	1.00

Hampton Roads, Va.

The most encouraging feature of this week's business at Hampton Roads is the good tonnage dumped for export shipment. Bunker steamers continue to report for coal in goodly numbers. In addition to this, however, several large cargoes have been loaded for both South America and Trans-Atlantic ports. As far as can be learned, this coal applies on regular contracts. Indications are that December loading will be at least one hundred thousand tons better than November, but even with this showing the year 1912 bids fair to fall below the year 1911.

Much coal has been taken by the government barges and collieries for war vessels now assembling for the holidays. New bids covering coal for the U. S. Navy covering six months beginning Jan. 1, will be opened within the next few days. Considerable interest has been manifested as to what the prices will be. Not for many years has the price of spot coal been generally stronger at this season of the year than today.

The Norfolk & Western Ry. seems to have set a pace for all coal-carrying roads during the past week by the manufacture of a 100-ton capacity coal car. In the initial trip of this car it carried 192,500 lb. of coal.

Louisville, Ky.

Traffic conditions still constitute the principal factor in the local coal situation, and are responsible for a practical reversal of the situation between the western and eastern Kentucky fields. While heretofore the former has been the worst sufferer from the car shortage, it now seems to have experienced appreciable relief in that direction, due, it is reported, to the fact that the Illinois Central, the principal carrier serving that district, is making extraordinary efforts to supply cars. There are as yet no

prices quoted, inasmuch as all operators are far behind on their contracts, and this fact, together with the requirements of the railroads, is responsible for an extreme dearth of commercial coal.

In eastern Kentucky, the situation is the worst yet, with no relief whatever in sight. The recent ultimatum of the Louisville & Nashville, demanding the output of all mines for three days a week, is in full force, although it was expected that only two days would be insisted upon. Demands are being received from concerns needing commercial coal, asking for any kind available, at any price; but there is practically none available.

The only quarter where the situation is entirely satisfactory is on the river, which has been open for traffic all through the fall, enabling large shipments and correspondingly large accumulations of Pittsburgh and West Virginia coals to be made. With recent arrivals in the river and the stocks on hand, there is said to be nearly 80,000 tons of river coal available, which is in good demand in barge lots at \$2.30 for lump, \$1.90@2 for mine-run, and \$1.65 for slack. The necessity for hauling the last named item renders it practically unavailable for industrial purposes generally, as dealers cannot handle it at the price. From all indications, it will be necessary to fall back upon this coal before the rail mines are in a position to meet the demand. The plentiful supply of Pittsburgh and other river coal, however, renders a serious shortage of domestic grades unlikely.

Knoxville, Tenn.

December has been a strenuous month for operators and any plans they have made at the opening of the month were early upset when the Southern Railway notified all operators on their line that they would expect practically all of their output. At an informal meeting of operators, held in Knoxville, this treatment of the Southern was openly denounced and it was declared to be the climax of unsatisfactory and outrageous service given the operators for years past.

Next came a letter from the L. & N. to operators on its line, saying that they expected to take the entire output for three days of each week, and would pay \$1 for straight run-of-mine. Another meeting of operators was called to take some action on this, but the L. & N. receded from its position and agreed to take 4-in. steam, thus allowing operators to ship domestic but cutting the output of steam fully 50 per cent. This condition is to prevail from Dec. 12 to 24. On top of this comes the usual holiday suspensions, and the result is that steam has gone to \$2, and this price is readily obtained by any operator who may have any of this grade to ship. Domestic has not advanced very much on account of this ruling.

Memphis, Tenn.

Owing to the extreme mild weather in and around Memphis and the territory from which she draws her fuel, there has been a decided break in the market as regards to prices. This, notwithstanding that the car supply has been about as bad as was ever known in the history of this section.

Western Kentucky mines are quoting:

Screened lump coal.....	\$1.40@1.50
No. 1 nut.....	1.00@1.10
Mine run.....	0.90@0.95
Screenings.....	0.50

All prepared coal is off from 10 to 25c. per ton, owing to the weather conditions. Never in the history of Memphis have screenings been so scarce and bringing such uniformly good prices. There is never any surplus offered that is not taken immediately by someone who is short on contract.

While the car supply on the I. C. R.R. has practically put the western Kentucky mines out of the market, it has been possible for this territory to draw all the coal necessary to fill all requirements from the Illinois field. The eastern Tennessee-Kentucky operators have practically caught up with all orders, and are waiting now for better weather conditions in which to market their screened product.

Indianapolis, Ind.

The coal-mining industry in Indiana and the adjoining states of Illinois and Kentucky is helped by the action of the Interstate Commerce Commission in the settlement of the protracted controversy between the Illinois Central R.R. and the operators on its lines in the above named states relative to the distribution of cars, in times of a shortage. It held that cars should be distributed according to the capacities of the mines; that those having an outlet by the river should be treated as junction-point mines, and that the Illinois Central should distribute its cars among these in proportion to the orders of the mines for cars from other carriers.

When no such orders on other carriers are made, the mines shall receive their full quota from the Illinois Central, and they shall receive 75 per cent. of that quota when cars are ordered from other carriers and 50 per cent. when cars are ordered from two other carriers.

The Indiana coal roads sent representatives to a hearing, Dec. 17, before the Railroad Commission of Indiana, called to investigate complaints of shortages of coal cars. The representatives testified that they had been making an effort to relieve the situation within the last few weeks. It was shown that several of the roads have been supplying 100 per cent. of the cars asked by the mines. The commission's record showed that complaints were the most numerous against the C. & C. I., and Chicago, Terre

Haute and Southeastern roads. Officials declared that they had been able to supply about 80 per cent. of the cars asked; the superintendent of the Big Four, 75 per cent., and the Vandalia about 80 per cent. The commission took the matter under advisement.

Never before was there such a long stretch of peace among the miners and operators as now. There is no trouble of any kind, the mines are working almost every day and business in the mining district is in a flourishing condition.

St. Louis, Mo.

The Christmas holidays brought no change in the local conditions, with the exception that there is plenty of coal under demurrage at East St. Louis, and for the past week or ten days Franklin County coal has been forced on the market at any price it would bring. Indications are that the coming week will start something in the way of business, and that after the first we will have a good demand. For a while there was a heavy movement of anthracite, but this has dropped off altogether, and so has coke; both of these fuels are in demand at the present time.

The prevailing market is:

Cartersville	
6-in. lump and 3x6 egg.....	\$1.40@1.50
No. 1 nut.....	1.20@1.30
No. 2 nut.....	1.15@1.20
Screenings.....	0.75@0.85
Mine-run.....	1.10@1.20
No. 1 washed.....	1.50@1.60
No. 2 washed.....	1.35@1.40
No. 3 washed.....	1.15@1.20
No. 4 washed.....	1.05@1.10
No. 5 washed.....	0.85@0.90
Franklin County	
Lump and egg.....	\$1.25@1.35
No. 1 nut.....	1.25@1.35
Screenings.....	0.75@0.85
Murphysboro Big Muddy	
Lump and egg.....	\$2.25
Trenton	
Lump and egg.....	\$2.25
Mount Olive	
6-in. lump.....	\$1.75
3-in. lump.....	1.50
Standard	
6-in. lump.....	\$1.20@1.25
2-in. lump.....	1.05@1.15
Screenings.....	0.50@0.55
Mine-run.....	0.90@1.00

Chicago

There has been a reduction in the demand for domestic coal, but the steam trade remains strong and has overcome a tendency to softness in the price of screenings; quotations for steam show a rising tendency.

The price for smokeless coal in Chicago remains firm. The minimum for mine-run is about \$1.50, with most sales being made at \$1.60@1.65. Western coals are weak. In some instances good sized tonnages have sold at \$1.75, the mines, with a few reports of sales at \$1.50@1.60.

Mine-run is selling from \$1.30@1.40, almost regardless of quality. This is due to unusual industrial activity. On ordinary grades of screenings the market

ranges from 70@80c. On better grades the price is 80c.@\$1.

Prevailing prices at Chicago are:

	Sulli- van Co.	Spring- field	Clinton	West Va.
4-in. lump.....	\$2.87			
Domestic lump.....		\$2.32	\$2.52	
Egg.....	2.62			\$4.30
Steam lump.....		2.12	2.17@2.27	
Mine-run.....	2.07@2.17	1.97	1.97@2.02	3.45
Screenings.....	1.62@1.67	1.47	1.57@1.62	

Coke—Prices asked for coke are: Connellsville, \$6.75@7; Wise County, \$6.75 @7; byproduct, egg and stove, \$6@6.25; byproduct, nut, \$6@6.25; gas house, \$6.

Detroit, Mich.

Bituminous—The Detroit operators are optimistic as to the future on steam coal. The demand is unusual at the present time and there seems to be unlimited supplies of the largest sizes coming in.

The operators are also much relieved to find that the Interstate Commerce Commission says that the railroads cannot charge the Detroit dealers \$2 per car for reconsigning. This is a great victory for the shipper and an unjust charge which they have fought relentlessly for the past year.

The conditions in this market will be noted by the following quotations:

	W. Va. Splint	Gas	Hock- ing	Poco- hon- tas	Jack- son Hill	Pitts- burgh No. 8
Domestic lump.....						
Egg.....	\$1.75		\$2.00	\$2.75	\$2.75	
Nut.....	1.50		1.60			
3-in.	1.40	\$1.40	1.50			\$1.50
Mine run.....	1.25	1.25	1.35	1.75		1.35
Slack.....	1.10	1.10	1.25	1.25		1.25

Anthracite—The unusual high prices for hard coal are getting down to somewhere near the circular. This is owing to the fact that an abundance of this product is arriving in nearly unlimited quantities. In fact, so much is coming in that the jobbers who invested heavily in the high priced coal will lose considerable because of being forced to sell the premium coal at circular.

Coke—The manufacturers of this product find that the demand is not as heavy as it was a few weeks ago and are quite anxious to dispose of as much coke as possible because of the liberal quantities of anthracite that are arriving. The prices have dropped approximately 25c. per ton since last week, gas-house being quoted at \$4.50, Semet Solvay at \$4.75, and Connellsville at \$5 for all sizes f.o.b. the oven.

Ogden, Utah

The demand for domestic coal has increased in the past week and the mines in both Wyoming and Utah are working every day. During the last half of November and the first ten days in December, there was a decided slump in the receipt of orders for rush shipments, and the mines were able to reduce the number of unfilled orders on their books.

A small surplus of nut coal was allowed to accumulate last week, but this

has now been disposed of, and with the usual holiday weather prevailing, there should not be an over-production of this grade of coal. The sugar factories have now discontinued their requisitions for slack coal, and most of the mines have a surplus of this grade.

During December closed equipment has been very scarce and at present the railroads are unable to offer any idea when this condition will be relieved. It has been occasioned by the ideal weather that has prevailed over the entire West. Scarcity of labor at the mines still continues, with no immediate relief in sight. This condition is attributed to the car shortage and the Balkan war. The war called a large number of Greeks and the exodus was quite noticeable. The car shortage during September, October and November caused a large number of miners to seek employment at other camps and in other lines of work. It will probably take some time for the shortage to readjust itself.

Quotations remain unchanged as follows:

	Wyoming	Utah
Lump.....	2.75	2.75
Nut.....	2.25	2.25
Mine-run.....	1.85	1.85
Slack.....	1.00	1.25

Production and Transportation Statistics

NORFOLK & WESTERN RY.

The following is a statement of ton-nages shipped over this road from mines in West Virginia and the commercial and company coal, for the month of November, in short tons:

Field	Tipple Coal	Total Coal	Com- mercial	Com- pany
Pocahontas.....	17,283	1,184,460	1,128,762	113,237
Tug River.....	4,362	196,433	160,880	35,553
Thacker.....	6,612	243,679	176,860	66,819
Kenova.....	6,176	76,948	69,599	7,349
Clinch Valley.....			129,220	8,538
	34,433	1,701,520	1,665,321	231,496

Shipments of coke, entirely from the Pocahontas field, were 109,526.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic over the lines of the C. & O. Ry., for October, 1911, and for the four months ending Oct. 31, 1911-12, in short tons:

Destination	Four months		
	October	1911	1912
Tidewater.....	287,078	1,318,282	1,214,311
East.....	197,350	869,189	751,702
West.....	827,485	3,972,930	3,491,474
Total.....	1,311,913	5,960,401	5,457,487
Coke.....	25,060	74,435	87,176
From Connections			
Bituminous.....	50,767	75,658	106,457
Anthracite.....	1,440	13,138	4,232

Foreign Markets

GREAT BRITAIN

Dec. 13—Business is very quiet, loading being difficult to arrange. Quotations are approximately as follows:

Best Welsh Steams.....	\$4.44
Best Seconds.....	4.26
Seconds.....	4.20
Best Dry Coals.....	4.32
Best Monmouthshire.....	4.20
Seconds.....	3.72
Best Cardiff Smalls.....	3.72
Seconds.....	3.48

The prices for Cardiff coals are f.o.b. Cardiff, Penarth, or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both exclusive of wharfage, and for cash in 30 days—less 2½%.

British Exports—The following is a comparative statement of the British exports for November of the current year and the first 11 months of 1911-12:

	Eleven Months		
	November	1911	1912
Anthracite.....	268,098	2,233,164	2,316,909
Steam.....	4,429,410	42,863,716	42,329,063
Gas.....	958,261	9,594,122	9,730,410
Household.....	156,401	1,374,219	1,497,908
Other sorts.....	285,275	2,740,134	2,873,446
Totals.....	6,197,445	58,805,355	58,747,636
Coke.....	125,601	948,883	928,612
Patent Fuel.....	142,025	1,481,829	1,394,032
Coal, Coke, & Pat. Fuel.....	6,465,071	61,236,067	61,070,280
Bunker Coal.....	1,714,064	17,696,757	16,734,586

Financial Notes

The following table gives the range of various active coal securities and dividends paid during the week ending Dec. 21:

Stocks	High			Low	Last
Company	High	Low	Last		
American Coal Products..	90	90	90		
American Coal Prod. Pref.	111	111	111		
Col. Fuel & Iron..	35	32	33		
Consolidation Coal of Md.	103	103	103		
Island Creek Coal Pref..	87	87	87		
Lehigh Valley Coal Sales..	230	230	230		
Pittsburg Coal..	24	20	23		
Pittsburg Coal Pref..	91	85	90		
Pond Creek ..	27	24	26		
Reading..	170	158	167		
Reading 1st. Pref.	90	90	90		
Reading 2nd. Pref..	95	94	94		
Virginia Iron C. & C..	58	53	58		
Bonds	Closing Bid or Last Sale			Weeks' Range	
Company	Bid	Asked	Weeks' Range		
Colo. F. & I. gen. s f g 5s..	97	102	98	98	
Colo. F. & I. gen. 6s..			107	June '12	
Col. Ind. 1st & coll. 5s. gu.	82	83	82	82	
Cons. Ind. Coal Me 1st 5s.	80	84	85	June '11	
Cons. Coal 1st and ref. 5s.		95	93	Oct. '12	
Gr. Riv. Coal & C. 1st g 6s.			102	Apr. '06	
K. & H. C. & Co. 1st s f g 5s.			98	Dec. '12	
Pocah. Con. Coll. 1st s f 5s.	87	88	88	88	
St. L. Rky. Mt. & Pac. 1st 5s.	76	79	79	Dec. '12	
Tenn. Coal gen. 5s..	101	102	102	102	
Birm. Div. 1st consol. 6s.	102	103	102	102	
Tenn. Div. 1st g 6s..	101	102	101	101	
Cah. C. M. Co. 1st g 6s.	103	110	110	Jan. '09	
Utah Fuel 1st g 5s..			83	83	
Victor Fuel 1st s f 5s..		83	85	Oct. '12	
Va. I. Coal & Coke 1st g 5s.	97	97	97	97	

Lehigh Valley (common and preferred)—Dividend of \$2.50, payable Jan. 11, to holders of record Dec. 28.

Lykens Valley R.R. & Coal—Dividend of 2%, payable Jan. 2, to holders of record Dec. 14.

Reading Co.—Dividend of 2%, payable Feb. 13, to holders of record Jan. 27.

American Coal Products Co. (preferred)—Regular quarterly of 1¼%, payable Jan. 15, to holders of record Jan. 10.

Central Coal & Coke—Regular quarterly of 1½% on common and 1¼% on preferred, payable Jan. 15, to holders of record Dec. 31.

Lehigh & Wilkes-Barre Coal Co.—Dividend of \$3.25, payable Dec. 11 to holders of record Dec. 6. Transfer books will not be closed for this dividend.

